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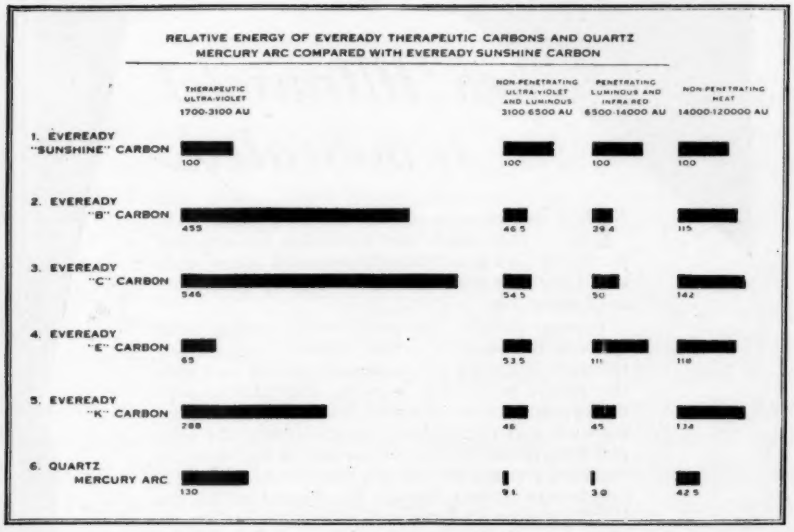

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THE METHOD OF CHOICE IN TONSILLECTOMY*

F. L. WAHRER, M.D.

MARSHALLTOWN, IOWA

In the past fifteen years, tonsillectomy has probably become the most frequently performed operation in surgery. In fact, it has become so common that the laity have come to regard it as a very minor operation. This conception of tonsillectomy is, unfortunately, also held by many physicians, although it is far from the truth. In too many instances it is a major operation done with minor operative precautions.

The removal of tonsils is in most cases a major operation, and should be done only by a skilled operator. Except in uncomplicated cases in children, the removal of tonsils is not a minor operation and should not be so considered.

In 1923 Loeb[1] of St. Louis reported sixty-two deaths due to hemorrhage after the removal of tonsils. Cox[2] in 1925, extended Loeb's investigation and brought the figures up to a total of two hundred sixty-one cases of alarming hemorrhage with a fatal termination in one hundred twenty-five cases. Naturally, these figures represent but a small percentage of the actual deaths that took place.

Reports from Jackson's Bronchoscopic Clinic, and other men who are doing bronchoscopic and lung work, show an alarming increase in the number of lung abscesses following tonsillectomy under general anesthesia. These men are pleading for more tonsillectomies to be done under anesthesia so light that the throat reflexes will not be abolished. It is possible for a skilled operator to do such an operation with one of the Sluder type of instruments. It has been my practice to do a modified Sluder operation under very light anesthesia for the past ten years.

Judson Deland of Philadelphia in a paper read before the American Academy of Ophthalmology and Otolaryngology at Montreal in September, 1926, says that many physicians fail to recognize the etiological relationship of the removal of tonsils to pneumonia and pulmonary abscess, and that they occur more frequently than is generally believed. Jackson, in a paper published in the Atlantic Medical Journal, February 6, 1927, on the subject of Post-tonsillectomic Abscess, says: "Fetterolf placed mortality in cases of pulmonary abscess following tonsillectomy at 25% to 50%. Wessler says that 80% of his cases of postoperative pulmonary abscess had followed tonsillectomy."

Besides pulmonary abscess, pneumonia, and hemorrhage, we have such other complications as shock, secondary infection, trauma to the soft tissues, scar tissues, embolism, and all the attending dangers that are present with either local or general anesthesia.

In the face of such reports and opinions, tonsillectomy certainly must be classed as a major operation, and careful consideration given to any procedure that will lessen the danger of the operation.

*Read at the eighth annual meeting, American Congress of Physical Therapy, Chicago, Nov. 4, 1929.

The indications for the removal of diseased tonsils cover a wide range of local and systemic conditions. The most common indications are: (1) mouth breathing, (2) frequent attacks of sore throat, (3) persistent enlargement of the cervical glands with no other apparent cause, (4) malnutrition, where other causes have been eliminated, (5) chronic and recurrent discharging ears, (6) fever, in the absence of other factors, (7) the presence of rheumatism or rheumatic symptoms, when the tonsils are diseased, and other sources of infection have been considered, (8) chorea, (9) pericarditis and endocarditis, (10) nephritis, (11) tubercular glands. (12) Many physicians feel that the removal of diseased tonsils is a preventive measure against diphtheria, scarlet fever and measles. There is considerable evidence that where the tonsils have been removed, the patient is not so liable to take these diseases, and when they do, the disease is not so severe and the sequelae not so serious.[3] (13) The removal of diseased tonsils in the presence of certain types of goitre, greatly facilitates their cure.

The tonsil is a lymph node that has lost its identity through changes in development.[4] It is not a special organ with a special development. I do not feel that there is any rational contraindication to the removal of tonsils per se. Nussbaum[5] feels that the tonsil has no demonstrable function and does not possess any defense against bacterial organisms. He feels that it does not even act as a filter.

Uncomplicated cases of tonsillectomy present but little danger when done by a skilled operator, especially if the operation is performed under local anesthesia. Where general anesthesia is used, the danger is considerably increased. The removal of tonsils in adults is always a major operation. In children, it can be made a minor operation under certain conditions.

In adults, the main complications to be feared are hemorrhage, lung abscess, and pneumonia. In children, the danger of hemorrhage is not so great, but lung abscess and pneumonia are more liable to occur because of the necessity of general anesthesia. When an adult takes a general anesthetic, the danger of lung abscess is even greater than in children.

In spite of any and all precautions, hemorrhage must be counted as one of the most important of all complications in the surgical removal of tonsils.

The alarming increase in lung abscess following tonsillectomy has been causing considerable unfavorable comment, and such men as Clerf, Brooks, Deland and Jackson have been pleading for lighter anesthesia, in order that the throat reflex will not be abolished. In spite of every care and precaution in the use of suction, posture, and operative technic, bronchoscopic investigation shows blood in the trachea and bronchi where the anesthesia is sufficiently deep to abolish the throat reflexes. Where the anesthesia is so light that the patient is still able to swallow, blood can be demonstrated in the esophagus but not in the bronchi. (Daly & Daly.)

I feel, therefore, that local anesthesia should be used whenever possible, and where general anesthesia must be used, the operation of choice should be of such character as to allow anesthesia sufficiently light that the throat reflexes are not abolished. Of the various methods described, practically the only method permitting the retention of the throat reflex under general anesthesia, is one of the modified Sluder types.

As stated before, the danger of lung abscess is not so great in adults where local anesthesia is used. The danger of hemorrhage, however, is greater in adults than in children, and I know of no surgical procedure in which this danger is completely eliminated. In electrocoagulation, the danger of hemorrhage is greatly reduced. While occasional cases of oozing have been reported, I do not know of any cases of serious or fatal hemorrhage.

The operation of tonsillectomy has been performed by various methods for many years. Celsus, born in 25 B. C., gives one of the first accounts of tonsillectomy, and was subjected to considerable criticism because he advocated the removal of tonsils by means of a knife. Fabricus condemned the knife because of the danger of hemorrhage. Previous to this time, it had been the custom to use the first finger of each

hand and the nails on these fingers were allowed to grow long and sharp, in order to facilitate the gouging out of the tonsil. In case this method failed, and the need for removal was very urgent, Paulus Egineta recommended the use of a hook and bistoury. Like Fabricus, he felt the danger of hemorrhage by this method was too great for routine use. This opinion continued to prevail for hundreds of years. The actual cautery was next tried, but met with but little favor. Slow acting caustics then came into vogue and were used for several centuries.

The eighteenth century found the ligature becoming popular, and quite universally used. In the latter part of this century, Moscoti, an Italian, tried scissors dissection, but criticism from the older and more conservative surgeons kept others from giving it a trial. The ligature method remained popular in America until about 1830. This method consisted of a silver wire passed through a double canula. This was placed around the tonsil and drawn tight. It was then left in place and tightened every day until the tonsil dropped off. This procedure took from four to five days. The pain and suffering which occurred, due to the intense inflammatory reaction, was intense, and patients would not submit to the operation unless the need for it was imperative.

In 1828, Dr. Alexander E. Hosack of New York, returned from France where he had seen tonsillectomies performed by knife dissection. The operation was quickly done and with a comparatively small amount of hemorrhage. He performed four of these operations successfully and published his comments in the American Journal of Medical Sciences under the title "Remarks on the Various Modes Usually Adopted for Removal of Tonsils." Dr. Physick of New York thought the method very dangerous.

The methods of tonsillectomy in use today includes: (1) Snare and dissection. (2) Various modifications of the Sluder method, either with a steel blade or wire snare. (3) Suction tonsillectomy, by the Waring method. (4) Removal by means of diathermy or high frequency current.

The snare and dissection method is the oldest of the more modern methods and the dissection may be done with either a curved or straight knife, or with scissors. The different types of knives used are almost without number. It depends upon the operator as to which type is most efficient. This method produces good results and in the hands of a skilled operator, the tonsils are removed quickly and cleanly. There is, however, some tendency to scar tissue formation following this type of operation, and small pieces of tonsil may be left at the upper pole unless extreme care is taken. When done under general anesthesia, it is necessary for the throat muscles to be completely relaxed, which means that anesthesia must be complete, and all throat reflexes abolished. This increases the danger of inhalation pneumonia and lung abscess.

The Sluder method consists in pushing the tonsil through a metal ring at the end of the instrument and then enucleating the tonsil in its capsule either by means of a semi-dull blade or by means of a wire snare fitted inside the metal ring. There are many modifications of the original Sluder guillotine. As to which one gives the best results, again depends on the individual operator. Personally, I use the Ballenger-Sluder instrument. There are several distinct advantages in the use of the modified Sluder methods over the snare and dissection methods. It leaves less scar tissue, and the tendency toward hemorrhage is not so great. Its greatest advantage, however, lies in the fact that where general anesthesia is required, it does not require complete relaxation of the throat muscles. This means one can use anesthesia so light that the throat reflexes are not abolished and consequently the danger of lung abscess and inhalation pneumonia is practically eliminated.

Waring's suction method of tonsillectomy has the advantage of protecting the patient from inhalation of blood at the time of operation, but it requires deep anesthesia, and leaves the patient unable to protect himself when there is bleeding subsequent to the removal of the suction tip which encloses the tonsil. Dr. Waring reports, however, that there is almost never any bleeding immediately following the operation.

Electrodesiccation of tonsils by means of a small monoterminal current, possesses certain

advantages over the surgical methods described, in that it practically eliminates hemorrhage, and the danger of lung abscess. The procedure, however, is so slow, and requires so many treatments over such a long period of time, that I do not feel that it is practical. The formation of scar tissue over the long interval of time required, makes it difficult for the operator to determine whether the tonsils are completely removed.

Electrocoagulation of tonsils possesses all the advantages of desiccation, and when properly done, almost none of its disadvantages. Its greatest drawback is the six or seven weeks time needed to complete the removal. Electrocoagulation is done by means of a bipolar diathermy current at a strength of from 2500 to 2700 M.A. It is an office procedure and hospitalization is seldom, if ever, necessary. Hemorrhage seldom occurs, either at the time of operation or later. The economic phase, which is an important factor with most patients, is reduced to a minimum by electrocoagulation. The patient does not need to go to a hospital and regardless of the kind of work he is doing, it is seldom necessary for him to lose any time from his work except that which is consumed in actually having the work done.

I feel that there is no such thing as a universal method of choice in tonsillectomy. The method of choice must necessarily depend on two conditions—first, the training and ability of the operator, and second, the condition of the patient and the type of tonsil to be removed. I doubt if any one method can be the best method for every operator and every patient. Every man doing tonsil surgery should perfect himself in that method which gives him the best results for his routine work. But he should also be able to skillfully perform other methods as the need arises. Probably 85% of all tonsil cases can be done by the routine method of the operator. The other 10% or 15% may call for some other method, in order that the best interests of the patient will be served. For instance, in all of my tonsil cases over fifty years of age, and those with a heart lesion, high blood pressure, or a tendency to hemorrhage, I do an electrocoagulation. I feel that these patients are subjected to much less danger by this method. Although I do not feel that electrocoagulation is suitable for routine work, it is the method of choice in selected cases of a certain type. It is also of great value in those cases that cannot get away from their work long enough for a surgical tonsillectomy.

I, also, feel it is the method of choice in the removal of small pieces of tonsil left after an incomplete tonsillectomy. There is also the tonsil which is badly scarred and firmly bound down with adhesions. These are frequently found following repeated attacks of quinsy. This type of case will generally adapt itself best to a snare and dissection operation.

SUMMARY

1. The history of tonsillectomy shows a considerable diversity of opinion as to the best methods, from the time of Celsus to the present day. Every new method which has been brought forward for over 1900 years has been received with criticism.

2. The operation of tonsillectomy is probably performed more often than any other surgical procedure.

3. Except in uncomplicated cases in children, it is in every sense a major operation.

4. The method of choice should be that which will remove the tonsils with the least danger to the patient, and which will keep him from his work for the shortest length of time. The first consideration is, of course, the most important.

5. Any procedure which tends to make the removal of tonsils a minor operation, rather than a major, is to be commended.

6. Adults should be operated under local anesthesia.

7. The greatest danger in adults is from hemorrhage. The greatest danger in children, where general anesthesia is necessary, is from lung abscess and pneumonia.

8. In a series of over 2,000 cases in children performed at The Iowa Training School for Boys at Eldora, Iowa, under general anesthesia, there has not been a single case of pneumonia, lung abscess or serious hemorrhage.

These cases were done by a modified Sluder method under very light anesthesia.

9. In 500 cases of electrocoagulation of tonsils in adults, I have had but three hemorrhages. They were very easily controlled. One of these was a case of sarcoma of the tonsil. In only two cases has the patient been unable to continue his work as usual, and then only for one day.

10. It is my opinion that the operation of choice in children, and in the average adult, is some type of a modified Sluder operation. In adults over 50, and in those cases having certain complications, electrocoagulation should be the method of choice.

11. No one method is suitable as a routine in all cases of tonsillectomy.

12. That method which gives each individual operator the best results, should be used by him for his routine work.

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DISCUSSION

Dr. J. H. Hester (Louisville, Ky.): The first thing I wish to speak on is the removal of tonsils in children. I always employ a general anesthetic, preferably ether given just as lightly as possible. The tonsils are removed very quickly, after which the child is turned on its face with the head down, in order that the blood and secretions may drain out. This is done as a preventive measure against lung abscesses and pneumonia.

For adults local anesthesia is employed. Patients receive one-quarter grain morphin sulphate hypodermatically fifteen to twenty minutes prior to the operation. The throat is sprayed before the operation with one per cent solution of cocain, after which a solution of novocain is injected just behind the capsule. Then the tonsil is split down as nearly as posible to the capsule. The tonsil is grasped with a tenaculum forceps, slight traction is made and the tonsil snared off with any of the instruments made for this purpose.

The tonsillectomy is completed in a few minutes with very little hemorrhage and a minimum of pain. This is the method I use because it has worked out.

Complications: Of course, hemorrhage ranks first. In children it is a minor complication; in adults it is more serious and sometimes requires much effort to control. I believe the large number of deaths from tonsillectomy due to hemorrhage can be controlled by greater attention to the condition of the patient before operation. Hemorrhage can be controlled unless the patient is a natural hemophiliac. If it occurs as it occasionally does good surgery and sound surgical judgment will prevent difficulties in most instances.

Lung abscess is the next serious complication. I have had the misfortune of seeing two such complications in my practice. These patients were adults who had a tubercular history. Their tonsils were bound down by adhesions and were rather difficult to remove; therefore, the anesthetic was prolonged. I believe that lung abscesses are due to prolonged anesthesia. The short general anesthetic is the most desirable, but the local anesthetic in adults will prevent the occurrence of many lung abscesses.

The indication for electrocoagulation: In my opinion the only indication is hemophilia. Every tonsil should be removed surgically, unless you have hemophilia to contend with; then, I believe, you should go after it with a method which will prove safe so far as hemorrhage is concerned.

Dr. M. H. Cottle (Chicago): I should like to ask some questions. First, I should like to say to Dr. Wahrer, your paper is really one of the best on the tonsil subject I have heard in a long, long time.

I should like to ask: What do you know about transillumination from point of view of diagnosis? What is your experience with expanded tonsillectomy where you try to get all the pieces from the epiglottis as far as you can go? How do you handle the adenoids when you do tonsillectomy?

Most of the cases of "tonsillar" hemorrhage that I have been called in to see in consultation have been adenoid hemorrhage. I think there is one particular phase we have to pay attention to: not to remove too much mucosa, not to remove the superior constrictor of the pharynx and think you are removing excessive adenoid tissue.

I have also done coagulation of tonsils and I find the method not without pain and not without danger of hemorrhage, although I think the danger of the hemorrhage could be very well taken care of. I do not think that presents a problem at all, because if you spark the area at the time of the operation and remove the debris, you do not have to fear excessive bleeding.

Dr. Carl B. Sputh (Indianapolis, Ind.): Dr. Dillinger has told us that he uses 10 per cent cocain on

a cotton swab painting four times without introducing a fresh solution and then electrocoagulates the tonsil without any pain. I tried this plan and my patient had considerable pain; then I tried to swab it four times with fresh cotton swabs and cocain each time, and still there was pain, although not quite so much. I would like to ask the essayist what plan of anesthesia he employs.

I might say a word about hemorrhages. I think many men doing tonsillectomy are entirely too careless. They do not inspect the throat after operation to see that there is no oozing or bleeding. If we would see to that right away, I dare say there would be very little postoperative hemorrhage. I have had three in several thousands of cases. These three were in adults and occurred in from three to eleven days after the operation. I am very, very careful about inspecting the throat before I finally stop the operation.

Dr. Robert H. Fraser (Battle Creek, Mich.): The point about our technic is that the dissection is completed in the upper two-thirds of the tonsil fauces by means of a rather blunt, golf-shaped dissector. The aim is to fray out the tissues, particularly those containing small vessels, in order that they may curl up and break themselves. The lower pole is detached by the snare. If you continue the dissection down, you take a V-shape and strip below the tonsil, whereas the snare absolutely limits the lower pole, especially posterior. I am speaking chiefly of people over fifty years of age, in the class that Dr. Wahrer says deserve extra precaution.

We have not done any coagulation for these cases, but in many of them, including the angina pectoris suspects and actual cases, we do the tonsillectomy according to the dissection technic. The ligation is always for a branch that is supposed to come over the superior edge and follow down between the angle of the palatopharyngeus and palatoglossus muscles.

With regard to the incident of hemorrhage, we have had cases where the routine ligature did not get everything to the upper pole and where we have had to put it in for the lower branch, or where a branch biturcatedy about the middle of the fauces. The instrument for putting in this stitch is a curved blunt needle which leads the ligature through so as to be caught by the long Allis forceps.

To sum up: We do have hemorrhages. We have much less with making the routine ligature, and a more defensive position is to be had from putting in the routine ligature than if it were omitted.

Dr. Sattleman (San Francisco, Calif.): I do a number of tonsillectomies and I never had a tonsillectomy hemorrhage I could not stop. I have seen very few in our private work at Sanford University. All interns have to be able to tie a plain catgut double-knot in a four inch tin can with eight inch Murphy clamps before they are allowed to perform a tonsillectomy. Our method is not one of transfixion. I believe that transfixion in tonsillar hemorrhage is not good surgery. Wherever you put a needle through, you have trouble.

We take the eight inch Murphy clamp, expose our vessels, which is usually one at the center, one at the bottom and one at the upper pole, grasp them and with another clamp throw a knot around and reverse it and make a square knot. I never had a hemorrhage I could not stop in that way, but it takes a great deal of skill and practice.

Dr. Wahrer: I agree with Dr. Hester that tonsillectomy in children should always be done under a general anesthetic. I do not always favor ether; in fact frequently I employ gas.

In regard to the local anesthesia: I have discontinued the use of the cocain spray in the pharynx. I have not found that it does any good. Sometimes I have felt that my patients suffered untoward systemic reactions which could be avoided. I have never seen a tonsil operation that was an emergency. Yet there are many operations performed without adequate preparation. The patients are not carefully examined for possible contra-indications. The office is still used as a tonsil operating room because it saves the patient a hospital fee.

I cannot quite agree with Dr. Hester that hemophilia is the only indication for electrocoagulation. That may be a little theoretical, but I reported a case this morning of a man 76 years old with arthritis; he had practically been bedridden for some months; his blood pressure was around 200; chronic valvular heart disease, very much undernourished and underweight. I dislike to handle a case like this surgically. They are poor risks. But I can do them by electrocoagulation without fear of severe reaction or complications. Of course, you do not have many 76 year old people who need tonsillectomy, yet in the aggregate of our practices there would be quite a few over seventy who need attention because of definitely pathologic tonsils.

As to the transillumination of tonsils I have had no experience with it. I do not remove the linguals when performing tonsillectomy unless some definite indication exists. There is considerable variation of opinion on this subject, but I prefer to take the conservative stand. Lingual tonsils, if bothersome, can be easily destroyed or rendered harmless by electrocoagulation at one sitting. In fact only one or two applications of the needle are required.

Dr. Cottle asked what I did about adenoids when I removed the tonsil by electrocoagulation. I perform the adenoidectomy under local anesthesia. I anesthetize the adenoids as completely as possible, although I appreciate a painless procedure under local cannot be performed.

Dr. Cottle does not think the percentage of hemorrhages surgically is any greater than what I reported

with my electrcoagulation. You must realize when I speak of five hundred cases of electrocoagulation, that means probably four thousand electrocoagulation processes; that is, you will run from four to five electrocoagulation treatments to each tonsil to remove it and this is commensurate, perhaps, to four or five thousand cases done surgically.

Dr. Sputh asked about the anesthesia in the cases of electrocoagulation. I employ 10 per cent cocain solution topically, but I use a fresh swab each time, and about half of my cases complain of a fair amount of pain; the other half say they have some discomfort. I do not have any of them say there is no pain, but about half of them say that the pain is negligible. They take it and get up and walk out without any marked suffering.

MODERN PHYSICAL THERAPY AND ITS APPLICATION TO HOSPITAL PRACTICE*

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Contrary to the usual ideas, physical therapy is not a new method of treatment, nor is it a subject that should inspire awe to the well trained physician of today. Nevertheless, to the minds of many in our profession, physical therapy seems new because it was not until the recent world war that the entire subject was accepted as a rational method of treatment. Every kind of therapy passes through a stage of empiricism, and the general conservatism shown by the medical profession in physical measures no doubt has retarded the evolutionary stage of this form of therapy. During and since the war general medicine and, more especially, surgery have utilized physical therapy to achieve in certain instances the most satisfactory results. This reawakened interest in the subject has had much to do with the recognition of physical therapy by contemporary medicine.

Those of us who attempt to practice this specialty in a rational and scientific manner have never subscribed to the idea that it is a cure-all. It is considered by the intelligent in our ranks as an adjuvant to other measures. It might be frankly said that with the exception of the use of ultraviolet for its specific effects on metabolism, and the use of electricity to destroy and remove tissue, physical therapy is never a "cure." The best definition of physical therapy is: "The use of non-medical, remedial agents in an attempt to convert an inadequate reaction into one that is adequate."

For the convenience of a small group of attending doctors, at the Vanderbilt Clinic (the Medical Center in New York), who prefer to outline their ideas of proper physical therapy for their patients, there has been prepared a list of forty-four different treatments that can be given in the Department of Physical Therapy. On close inspection of this imposing list, it is possible to perceive that there really are only three general effects achieved by physical therapy outside of its psychic properties. These three effects are, first, the induction of increased temperature on or within the body either generally or locally; second, the mechanical effects produced actively or passively upon the body and, third, very mild chemical effects. All that physical therapy does is to create heat or motion and induce chemical reactions.

If these three results are kept in mind, when it is desired to incorporate such reactions in the treatment of a patient, there should be no hesitancy in prescribing them because of a lack of knowledge of how to apply them. When the attending physician considers that possibly mechanical motion will keep adjacent joints limber during the regular treatment of a fracture, he does not need to know how to induce this motion if his hospital is equipped with a physical therapy service, as so many modern hospitals are. If in the treatment of a low grade infec-

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tion heat in or to the part is indicated, there is legitimate use for physical therapy. Many examples can be given of where an understanding of these three reactions will enable a physician to make use of physical therapy.

As a brief illustration of how these three effects can be induced, it is probably best to consider heat first. It is a well known fact that energy in motion, when it is stopped, is converted into heat. Therefore by applying moving energy to the body, heat can be created exactly where it is wanted. Probably the most convenient method of forming heat is by the application of radiant energy. This is applied either with an infra-red generator, such as a copper reflecting heater, or by the use of visible light. Infra-red is light and is only so named because its wave lengths are too long for the eye to perceive, although from a physicist's standpoint it is exactly the same kind of energy. Therefore one can predict that when infra-red and visible light are directed on the body, this light, being energy in motion which is stopped by a more opaque body must be converted into heat. Experiments have proven that visible light will penetrate the depth of an inch and seven-sixteenths of living tissue. We can therefore expect that the last bit of light is stopped at the depth of one and a half inches and, consequently, from that level outward, where definite percentages of the light are stopped, the heat is formed at each of these levels. Infra-red is the zone of light of wave lengths longer than 7700°. It extends down the electromagnetic scale until the region of radio frequency is reached. Here the oscillations are slowed down and the physical characteristics of light are changed. The energy which will penetrate through the entire body is therapeutically useless because only the energy that is stopped or absorbed can produce heat. The small band of infra-red between 10,000 A.U. and the visible red has not the power to penetrate through a millimeter of distilled water. Consequently that energy is all stopped on the surface of the skin; and probably many of its physiologic effects are obtained through counter-irritation.

If an electrical current is passed through the body and this current oscillates more than five thousand times a second, heat is induced without any neuromuscular response. This is the principle on which diathermy works—the intentional interposition of living tissue into the path of an induced electrical current of high frequency. There are other methods of producing heat in the body, such as surrounding of the part or the whole body with super-heated air or warm water. Application of hot water bags or hot pads are conceded to achieve their efforts through counter-irritation and not by general body heating.

The mechanical effects achieved by physical therapy are produced by massage manipulation, and various forms of neuromuscular stimulation by a low voltage direct or alternating current at a regular speed so that no chemical polarity effects only muscular stimulation are achieved. This effect is produced by the surging galvanic or sinusoidal current. But by far the greatest mechanical effects that can be induced in the body are produced by the old frictional current, called the "static," which is a current of extremely high voltage and minimum amperage. Voltage in electricity represents pressure and amperage or heat represents volume. Consequently, when energy of a small volume is moving under great pressure, only mechanical decongestive effects are regularly achieved. The value of static electricity is gradually becoming more recognized in rational physical therapy; its effects are so constant that students of electrotherapeutics are showing increased interest in the great usefulness of the static current. Many men who profess to understand electrotherapy show a lamentable lack of real knowledge when they decry the use of static electricity. No other electrical current will imitate the effects of static electricity and it can be emphatically stated that the static machine is the most useful modality in physical therapy. Many men who have commented against static electricity only have had a passing acquaintance with it, and little know its real significance in the practice of physical therapy.

Some mechanical effects are also achieved by the use of water under pressure when it is sprayed on the skin, or when water is greatly agitated with air purposely passed into it. The modern whirlpool bath fulfills both purposes and was created during the world war. It combines

the double effect of gentle heating of the affected part plus the stimulating friction of the moving water.

The chemical effects achieved by physical therapy are very weak as chemical reactions go, but very useful in a small field of conditions. The most prominent agency at present that is used for this purpose is the ultraviolet light. This instrument emits an invisible energy that acts as a photolytic or photochemical stimulator in perverted metabolic processes. It also favorably influences certain known blood dyscrasias, rachitic states and the calcium and phosphorous salts of the body. It is a patent catalytic agent. There is at present a growing conviction that similar effects as well as that of activating the vitamin D may be obtained with infra-red radiation.

Electrochemical effects can be induced by the constant or galvanic current, with specific polar effects that are diametrically opposite to each other. Scientific investigtion has, however, proven that the galvanic current does not directly influence drug diffusion. The circulation acts as a buffer and transports the elements to other parts and away from the intended area. Medical ionization is a myth brought down to us by practitioners who were less informed and therefore greater optimists.

Inasmuch as most hospitals today have enough interest in physical therapy to have a few machines, it is to be regretted that many of the attending physicians defer making use of the service because of a lack of knowledge of the subject. The main purpose of this paper is to emphasize how simple is the scope of reactions that can be induced by physical therapy. They are not nearly as complicated as those that can be obtained in the long list of drugs in the pharmacy of a hospital. The director of a department of physical therapy, or whoever is in charge, stands in relationship to the rest of the hospital very much the same as does the pharmacist. The prescriptions are written by the attending doctors, sent to the drug room, compounded and given to the patient to take. Much more simple is the procedure for attending doctors to prescribe "physical therapy for the increase of function," "to increase a patient's resistance" or "physical therapy for rickets." The patient then takes the prescription to the director of physical therapy and instead of getting a bottle to take home, he has the treatment administered to him personally in the department, returning for each dose.

It is interesting to note that in most small hospitals where room is given over to the use of the physical therapy service, the first year or two shows an increasing attendance in the department. Then, after several years of observation of three or perhaps four years of consistent results the attending doctors buy their own apparatus, and treat their patients in their own offices. The hospital management begins to complain because the income of the department has diminished. Of course, this is an unhappy situation. The director is always watched to see that he does not spend too much, and is encouraged to make as much money as possible for the hospital, because a department of physical therapy can easily be made to run at a profit. However, the bright side of this situation is the fact that, in practically every hospital, the attending staff gradually come to realize the usefulness of physical therapy and become staunch supporters of it in due time.

As an example of how attending staffs interest themselves in physical therapy, I cite the situation at the Vanderbilt Clinic in New York. As Director of that department I am supposed to visit other departments in the clinic, and make rounds on the wards in order to be consulted as to the uses of physical therapy. My department has been operating fourteen months and, without any special effort or intensive propaganda, it has had over 3,200 admissions. With the exception of the summer months, the attendance has been over 150 patients a day. It is difficult to keep the attendance below 200 a day. I am certain that our attendance could have been materially raised had I made any special effort. My desire has been to raise the quality level rather than the quantity level.

LOW VOLTAGE CURRENTS IN CONTRACTURES OF THE HAND*

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Physical therapy in the form of electrical stimulation, heat, massage, and exercises is invariably prescribed by surgeons as after treatment in injuries of the hand, because it is well recognized by them that this treatment hastens recovery, prevents contractures, and improves the function of the hand. Yet, in the text-books that deal with infections and injuries of the hand, very little attention is given to any specific procedure, or to the mode of treatment with physical therapeutic apparatus. These are the things that I should like to discuss in this paper.

The low voltage current plays an extremely important role in restoring muscle tone, by stimulating and producing contraction in those muscles which have lost their tone as a result of injury to the muscle fibers, or as a result of injury to the nerve supply of the muscle.

Muscular wasting whether it is due to injury or disease can, when the nerve supply is unaffected, be readily and quickly cured by electrical stimulation. The form of electrical stimulation that is to be selected is one that most closely reproduces the physiological contractions of the affected muscle. Such a contraction is of a tetantic character and can be obtained with the faradic current. The stimulus must be applied with even gradation, beginning with zero and gradually reaching a maximum, and returning to zero with a period of rest between contractions.

With reference to contractures of the hand which follow injury to the tendons, the nerve supply is at times unaffected and yet paralysis with its resultant contractures takes place. These conditions of course always call for operative interference, but the most skillful operation is fruitless unless it is followed by the proper physical therapeutic measures.

Our method in the treatment of tendon injuries is to use the galvanic current from seven to ten days fter the operation. The hand is immersed in water to which sodium chloride or sodium bicarbonate has been added; a cuff made of a folded towel which has been moistened in the same solution over which a narrow strip of metal has been placed is applied to the forearm taking care that no metal touches the skin. The current is then applied for twenty minutes, not quite to the point of tolerance, and is then gradually stopped. The part undergoing treatment is left undisturbed, the electrodes are left in place, and the sinusoidal current is introduced with sufficient strength to cause a twitch of the involved muscles. Usually only five contractions are produced at the first treatment. This regime is repeated daily, in addition to the regular galvanic treatment of twenty minutes. As the condition improves, the sinusoidal current is administered so that the contractions are increased in number as well as in strength.

Our reason for using the electric current, is to reduce the unorganized exudates found in tissues after trauma, operation and manipulation and to prevent fibrous organization and the formation of adhesions. The passage of the galvanic current brings about an increased blood supply to the part, thus helping to remove the effusion, and, in a large measure, preventing organization and fibrosis. This prophylactic measure is further enhanced by muscular contraction which has a tendency to free the muscles from any adhesions which may be present.

Gentle massage is also instituted at this time, and with progress is changed to passive and then to active motion. Great care should be taken that both the electrical stimulation, as well as the passive and active motion are administered gradually, always bearing in mind that it is possible to rupture sutured tendons as a result of over treatment.

In the treatment of infections of the hand it is important to know the anatomy of the part

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in order to avoid complictions which may arise from the peculiar structure of the hand.

Cunningham describes the palmar aponeurosis as a "thick triangular membrane, the apex of which joins the distal edge of the transverse carpal ligament, and more superficially receives the insertion of the tendon of the palmaris longus muscle. The fascia separates below into four slips one for each finger, connected by transverse fibers, and forming beneath the webs of the fingers the superficial transverse metacarpal ligament (fasciculi transversi). Beyond this, each slip separates into two parts to be connected to the sides of the metacarpophalangeal joints and the first phalanx of the medical four digits . . . . The lateral borders of the triangular central portion of the palmar aponeurosis are continuous with thin layers of deep fascia which cover and envelop the muscles of the thenar and hypothenar eminences."

In tendon infections passive and active motion should be begun as soon as the danger of systemic infection is over. This is usually from two to three days after the wound has been incised. The object of this early manipulation is to prevent adhesions. This is done by placing both the hand and forearm in hot water while the technician gently extends and flexes each finger as well as the hand at the wrist several times, being very careful not to indulge in violent movements.

We also immerse the hand in a 2 per cent solution of zinc sulphate to which the positive pole of the galvanic current is applied, the negative pole being attached to a cuff made of toweling which has been moistened in a 2 per cent solution of sodium bicarbonate. The object of this treatment is to help clear up the infection by virtue of the deposition of zinc ions into the infected area. Immediately following this treatment the edema of the part subsides and the pain is also appreciably decreased.

This form of treatment is kept up daily until all signs of infection disappear, then the galvanic current is replaced by the sinusoidal current and both flexion and extension is obtained by electrical stimulation using the methods mentioned above. This is supplemented by massage, passive, and then active motion. The patient must aid and not resist these movements.

Electrical stimulation of muscles whose nerve supply is affected or injured is of the utmost importance, since it is well known that the passage of the galvanic current is of distinct aid not only in the regeneration of nerves, but in increasing the flow of blood to the muscles undergoing treatment. In this manner muscle tone is retained so that when regeneration of the nerve does take place the muscles are in condition to take on their normal function. In contractions which follow nerve injuries it is first necessary to determine the amount and type of nerve involvement. This is done by testing for the reaction of degeneration.

Dr. Stone states that "the reaction of degeneration is a term designating either a partial or complete impairment of the ability of a nerve or muscle to react to electrical excitation normally. The type of reaction, i. e., either partial or complete, is dependent upon the extent of the injury or disease to the lower motor neuron. The mildest form of impairment consists in diminution of electrical response to the faradic current and necessitates increasing the strength of this current in order to get a contraction. No contraction, however, can be obtained with the faradic current if there is more marked nerve degeneration. This degree of nerve degeneration will give a good response with the galvanic current. Should the nerve degeneration be still more marked greater amperage is necessary, but the contraction is sluggish. Still further degeneration will elicit no response to the cathode but will produce a contraction with the anode. Finally in a complete nerve degeneration no repsonse with the galvanic current occurs except a slow vermicular wave-like contraction if the muscle itself is stimulated. In other words, there are found definite quantitative and qualitative changes in the electrical reaction in lesions of the lower motor neuron. More contraction will be produced if the electrode is moved away from the motor point toward the tendon.

A complete reaction of degeneration is characterized by the following symptoms:

1. The excitability of the nerves by the faradic current is abolished.

2. The excitability of the muscle by the faradic current is aboilshed.

3. The excitability of the nerves by the galvanic current is abolished.

4. The excitability of the muscles by the galvanic current is modified in such a way that the contraction is slow and vermicular and that the anodal closing contraction is greater than cathodal closing contraction: A.C.C., C.C.C.

5. The chronaxia value is markedly increased.

After the type and amount of nerve involvement is determined the patient is given electrical stimulation using the monopolar method.

A surface electrode about 5 by 8 inches is placed on the back or in the cervical region and a small diagnostic electrode with an interrupted handle is applied to the muscle. The positive pole is applied to the back and the negative to the handle using just enough current to obtain a twitch."

Five milliamperes of current strength is used, permitting this amount to flow for three or four seconds, treatment being given three times a week. As soon as the tests show that the nerve is beginning to function, the current is changed to the sinusoidal type using just enough to obtain a slight twitch of the muscle. At first we produce five contractions of each affected muscle. This prescription is given three times a week. The next week we increase to six contractions three times weekly, then further increase the treatment to ten contractions for each muscle.

Massage, passive and active motion always supplement the electrical treatment.

In Dupuytren's contracture it is imperative, in order that a good result be had, that electrical stimulation as well as massage and exercise be properly administered. Physical therapy should be instituted a week to ten days following operative measures, using the procedure outlined for contractures due to tendon injury.

In Volkman's ischemic contractures galvanism is administered. Both the hand and forearm are immersed in water to which the positive pole is connected, the negative pole being suitably placed. The duration of the treatment is thirty minutes. The muscles which are involved are tested at frequent intervals and as soon as evidence of regeneration is present the sinusoidal current is used and in turn gradually changed to the faradic current.

This type of pathology is rare. We have had no cases at the Cook County Hospital during the last two years.

The following are typical case reports of patients treated at the Cook County Hospital:

(1) R. N. admitted to the Cook County Hospital on July 24, 1929. Patient entered the hospital with a laceration of the left wrist, the part bled profusely and there was inability to move the left wrist and flex the fingers. The essential pathology consisted of a laceration three inches long transversely across the anterior aspect of the left wrist exposing many cut tendons. The operative report states that as many of the flexor tendons as could be isolated, were matched up and sutured. The physical therapy treatment consisted of galvanism to the hand for a period of twenty minutes followed by the sinusoidal current, as well as massage, passive and active motion. This patient has recovered the use of his fingers, flexion being restored to 90 per cent.

(2) L. J. entered the hospital July 28, 1929, giving a history of cutting palmer side of the ring finger, this cut subsequently healed and the finger has remained in flexion ever since.

The essential pathology consists of complete flexion, and on attempt to extend the finger great pain is felt. Diagnosis of old scar probably involving the nerves was made. The treatment consisted of applying the galvanic current with an electrode moistened in sodium chloride using the negative pole to the scar, the object being to soften the scar. The sinusoidal current was then applied in order to produce extension. The finger at this date has about 75 per cent extension.

(3) J. S. entered Cook County Hospital July 7, 1929, with a diagnosis of old injury to the forearm, giving a history of running a drill through his forearm on December 4, 1928; was

treated by his own physician until February 29 and had no treatment since. The essential pathology consists of a longitudinal scar starting at the wrist on the flexor surface of the forearm extending midway up the forearm, a U shaped scar also traverses most of the extensor surface of the forearm. The neurological examination shows involvement of the ulnar medial and muscular spiral nerves. A typical claw hand is present, the thumb is extended and adducted with atrophy of the thenar and hypothenar eminences interosseous and lumbricalis muscles. The hand is cyanotic, sensitivity is present except on the dorsal surface of the middle and ring finger where pin pricks are not felt.

This patient was given galvanism followed by the sinusoidal current as well as massage and active motion, the hand is warm, less cyanotic and at the present time about 50 per cent extension.

CONCLUSION

All injuries of the hand should be given the benefit of physical therapeutic measures. This consists of the selection of the proper electrical stimulation, massage, passive, and active motion, as well as home exercises. With these measures the convalescent period is shortened, the patient suffers far less pain, contractures are reduced to a minimum, and maximum function is restored.

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DISCUSSION

Dr. F. H. Ewerhardt (St. Louis): This is one of the most interesting papers I have heard on the treatment of contractures of the hand. I enjoyed the paper not only because the essayist gave the facts as they are generally presented, but he gave in addition detailed technic. He told us what to do with the hand; he told us how to apply the electrode, how long to apply the current, and those numerous little details, the want of which always worries those of us who sit in the audience and listen to papers which don't give them. We generally listen to papers that generalize; but this paper is characterized by the fact that he has given a picture of how to treat that arm if I have the case to treat.

Dr. John D. Ellis (Chicago): I concur in what the doctor has presented in his paper. I think it is a very splendid presentation.

Dr. A. T. Clopton (Edward Hines Hospital, Chicago): I enjoyed this paper very much. Dr. Ewerhardt said that one of the outstanding features of the paper was that he went into detail. He gave us the technic with which to treat this condition. The men specializing in physical therapy frequently lose sight of the fundamentals associated with the special measures used, such as the galvanic, faradic and sinusoidal currents. With the nice-appearing apparatus that the different manufacturers put on the market today, we are prone to be attracted without any other reason to them. We can often get better results with some of the real basic fundamental principles of physical therapy than with some of the newer, possibly fancier looking apparatus.

As Dr. Coulter mentioned a few moments ago, occupational therapy is one of the things that goes so hand in hand with physical therapy that they are almost inseparable, especially in industrial work.

I have been with the government in charge of what they call their reconstruction work for the past several years. I have charge of both the physical therapy and the occupational therapy, and I have had an excellent opportunity to see results obtained from a combination of these modalities, and in these very conditions that the paper has just dealt with. We often get an added benefit with the combination of physical therapy and occupational therapy. I think the time is coming when the industrial surgeons and concerns of the country will have a combination of the two, because I think they get better results, they possibly get quicker results because they have something for the patient to see; some results are obtained from occupational therapy because it is employed between the treatments.

Dr. Louis Gries: The object of this paper was to give in detail some of the methods used at the County Hospital, and I am glad that it found approval.

RADIUM IN THE POSTOPERATIVE TREATMENT OF POLYPOID SINUSITIS*

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Polypoid sinusitis, or degeneration of the mucosa of the nose and accessory sinuses, is a pathological process frequently encountered and stubborn to treat. The results of medical treatment and surgical measures are usually discouraging to both the patient and the physician. The etiology of this condition is not well understood. It is usually, but not always, associated with a suppurative sinusitis. Skillern states that repeated attacks of coryza, each one leaving greater changes in the mucosa, contribute to the ultimate formation of polypoid tissue. Influenza appears to be a predisposing factor. Vasomotor changes also play a part in the process. Hyperemia of the tissues with a continued exudation of serum into the interstitial spaces plus the force of gravity tends to produce mucous polyps. The pathological picture shows round-cell and leukocytic infiltration in the mucosa, edema of the connective tissue, hypertrophy of the mucous glands, thickening of the periosteum and finally bone absorption. The polyps may appear as myxomatous, adenomyxomatous and angio-fibro-myxomatous varieties. In rare instances, a myxomatous polyp may undergo a malignant transformation. I refer to a case in a woman, aged 57 years, who had a large myxomatous polyp which filled the right nasal cavity and extended into the pharynx. A suppurative sinusitis preceded this condition. The polyp was removed and both clinically and microscopically was myxomatous. Five months later a recurrent deep purplish vascular mass was noted. The pathological report showed cavernous hemangioma. There was a rapid recurrence and section of the tissue one month later showed an angio-fibro-sarcoma.

The symptoms of polypoid sinusitis depend upon the extent and severity of the disease. Nasal obstruction, mucoid or mucopurulent discharge, headaches, loss of smell, bronchitis and not infrequently asthma are the chief symptoms.

In the early stages of the disease with few polyps present, conservative removal, including a small area of surrounding tissue, may suffice. In the advanced stages the ethmoid capsule and other accessory sinuses show polypoid degeneration. Hence more radical procedures are undertaken. The late Dr. Sluder has stated that regardless of the surgery—conservative or radical—the end result is that the patient still has polyps. Removal of the polys does not affect the underlying inflammatory process which must be attacked.

Radium and other physical agents have been used postoperatively in polypoid sinusitis with considerable benefit. The action of radium upon this pseudo tumor tissue is to produce a fibrosis in the submucosa. It is noted that after radium treatments fewer polyps recur and that they are decidedly more fibrous in character than the usual myxomatous variety. The interval between recurrences is lengthened and the nasal discharge diminished. An ethmoidectomy with removal of the polyps should precede the application of the radium. In this way the base of the polypoid areas may be made accessible for treatment. The radiation treatment consists in the application to the ethmoid area one week after radical operation of a 50 mg. radium capsule screened with 0.2 mm. platinum and 1.0 mm. of brass. Only gamma radiations are thus employed. Radon may be used in a similar manner as radium. The time of application is from three to four hours, giving 150 to 200 mg. hours per treatment. The applications are made at intervals of ten days to two weeks for an average of four treatments. In recurrent cases after ethmoidectomy the local recurrences may be removed and radium applied immediately. A double string of silk or dental floss is attached to a small ring in one end of

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the radium capsule. Vaseline gauze packing is used to maintain the tube in position and is applied between the tube and septum to prevent overaction of the radium on the septal mucosa. The loose end of the string is strapped securely to the patient's cheek and around the ear, as there is a possibility of the tube being dislodged to the nasopharynx and swallowed.

In a small group of cases, usually in young people in which there are large vascular polyps, gold radon implants of 1.0 millicurie each may be inserted into the tumor tissue, using one implant to each cubic centimeter of tumor tissue. Hemorrhage is thus controlled and operation is performed four to six weeks later. This type of treatment also applies to another pathological process, the fibromas of the nasopharynx, many of which will disappear after radium treatment or reduce in size and made avascular and rendered safely operable.

In polypoid disease of the maxillary antrum radical operation, preferably the Caldwell-luc, is performed. Recurrences do not appear to be as frequent as in polypoid ethmoiditis. An intranasal opening into the antrum should be maintained so that endoscopic examinations may be made. It is more difficult to apply radium in the antrum than the ethmoid area. However, small radium capsules may be inserted into the antrum through the intranasal opening, or radon implants or not more than one millicurie strength may be inserted into the recurrent polypoid mucosa. A recent case referred by Dr. William Holden: a woman 56 years of age, gave the history of asthmatic attacks for many years, with nasal catarrh and finally impaired hearing. Her asthmatic condition had been treated for many months by vaccines without improvement. Dr. Holden performed a bilateral Caldwell-luc operation and many large polypoid masses were removed. The asthma disappeared and patient remained well for a year, when the attacks recurred. Endoscopic examination at this time revealed four or five polyps, three to eight mm. in diameter, in the right antrum. The left antra was free and the ethmoid areas showed thickened mucosa but no polyps. Five 1.0 millicurie gold implants were inserted into the polypoid masses in the antrum and after a few days the asthmatic attacks disappeared. The ethmoid areas have received treatment by means of the radium capsule. The patient's condition is markedly improved, polypoid areas in antra have become fibrous and a shrinkage of the hyperplastic mucosa in ethmoid area has been noted.

SUMMARY

1. In a series of 40 cases of polypoid sinusitis, treated by radium, 28 had previously received surgical intervention by partial or complete ethmoidectomy and antrotomy.

2. Asthma, a complicating factor in nine cases, was controlled in seven.

3. The mucoid and mucopurulent secretions have been lessened.

4. Headaches have been relieved and in a few cases the sense of smell has returned.

5. Small polypi have been made to disappear and the interval between the recurrences has been lengthened.

120 East 75th Street.

TISSUE REACTION IN CHRONIC ULCERATION OF THE SKIN*

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The title of this paper was suggested by the favorable results which followed the application of orthoform ointment and the x-ray to the bilateral areas of ulceration of the lower extremities due to erythema induratum of Bazin. The results were not due to the x-ray alone, for this had been used previously on several occasions, causing merely a discoloration of the membranes covering the ulcers, with the gradual production of purulent material underneath. This membrane would eventually come away, but no lasting beneficial results were obtained; the condition was only slightly improved after a lapse of ten months. The first attack began five years previously; the ulcer healing for a short period, only to reappear in the immediate neighborhood.

Likewise the application of the 15 per cent orthoform ointment alone did not produce the changes typical of orthoform poisoning, for it had previously been used locally over a period of two weeks without producing any such manifestations. Five days after the roentgen therapy, an increasing erythema and oedema of both lower extremities developed, which caused marked local and some general reaction seven days after the exposure. The legs were painful, due to the ulceration as well as the oedema, which spread above the knee. No red lines typical of lymphangitis developed and the femoral glands did not enlarge. The temperature rose to 101 degrees, when the generalized eruption due to the orthoform had developed. The membranes covering the ulcers became darker in color, eventually they became necrotic, and sloughed away in about three weeks after the exposure to the ray. A granulating surface was left which quickly began to heal. According to the observations of the patient, on previous occasions pus would form under the membrane following the use of the x-ray. On this occasion the marked local reaction produced a sloughing of the membranes, followed by a destruction of the superficial tissues, which left a healthy granulating surface.

In addition to these measures the patient was given tonics; she was asked to stay off her feet as much as possible, and specific stimulation in the form of subcutaneous injections of autogenous vaccines and tuberculin, was employed. How much the latter assisted in the rapid healing, it is difficult for me to state. Each injection was followed by local but no general reaction. It was deemed advisable to use these general and specific measures for no improvement had followed the use of local medication alone. In fact the mistake which apparently had been made by the dermatologists was to treat the patient for too long a period with anti-syphilitic remedies, due to the peculiar punched out appearance of the ulcers which perhaps suggested the presence of lues.

Some will state that the reaction was simply due to the ordinary toxemia which may follow the use of orthoform, and that an accumulative effect was necessary for this reaction to occur. The roentgenologist insists that the reaction did not follow the use of the ray alone. We both agree that it was the combined effect of therapy and the orthoform which produced a destructive effect on the tissues, followed by mild toxemia typical of orthoform poisoning. This naturally suggests the combined use of the x-ray and various irritating and stimulating chemicals, in regulated amounts, in order to secure local reactions in chronic ulcerations of the skin. It probably would not be advisable to employ it in the old, so-called trophic, varicose ulcers of the lower half of the leg.

CASE REPORT

A woman, aged 23, was married in the spring of 1923 and six weeks later injured the right shin by bumping it against a chair. A patch of erythema developed, which was incised by a physician, causing an ulceration which took one

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year to heal. Sometime later, erythematous patches developed over both lower limbs, anteriorly and posteriorly, preceded by small nodules. These would ulcerate leaving a punched out area strongly suggesting the presence of syphilis, although the history on both sides and the Wasserman tests of the blood were negative. Intravenous injections of neosalvarsan were given by a dermatlogoist over a period of many months; the patient became worse instead of better. In the summer of 1927 she returned to a well known dermatologist who had previously advised the use of salvarsan. He discontinued the use of this remedy and later gave two x-ray exposures, with some improvement. Last summer she also was examined thoroughly in Baltimore where the diagnosis of erythema induratum was made. In April, 1928, she returned to this city and upon the advice of a friend, I was asked to treat her.

The patient was able to be up and about and at first came to the office. The general condition was satisfactory except that she was anemic and overweight. In fact she attributes the onset of the disease to the fact that she had attempted to live on an apple and a quart of buttermilk a day, just before her marriage, in order to reduce her weight. This, she thinks, lowered her resistance, and caused the complication which followed the simple trauma to the leg. Over the right and left lower legs anteriorly, numerous punched out ulcers were present with surrounding induration and brownish discoloration. These areas were covered by a greyish membrane. On the left lower leg, these ulcers penetrated almost to the bone in the rear, causing considerable pain, especially when not covered. Cultures were made from these ulcers on various media, and staphylococcus albus and streptococcus pyogenes were grown; an autogenous vaccine was prepared and used subcutaneously in increasing amounts. In addition, the patient gave a distinct local reaction to the intradermic injection in 0.2 c.c. amounts of the new "tebeprotin" made after the method of Toenniessen. This preparation is a water soluble preparation of the proteins prepared from bodies of the tubercle bacillus. Increasing amounts of the preparation were subsequently used, always with local but no general reaction. It was found that an ointment of 15 per cent orthoform in simple vaseline gave her some relief, but produced no local improvement and no general toxemia. Two weeks later, Dr. Chas. Goosmann of this city, gave her an application of the roentgen ray employing 5 milliamperes of current, at a distance of 12 inches from the Coolidge tube, with 8 inch spark gap, for a period of 3 minutes. For five days the patient noticed nothing in particular. Then the local condition of the legs grew gradually worse, pain, erythema, and oedema, attended by a typical generalized eruption with fever, the reaction lasting about two weeks. The membranes sloughed away leaving a healthy granulating surface. One month after the exposure to the ray, there were two ulcers over the lower right leg, the one ulcer measuring an inch across and the other one-half inch. One month later, they were completely healed. Upon the left leg there were five ulcers, anteriorly and posteriorly, the greatest one measuring three inchs across. At the end of two months, they were filling in rapidly about one-third the size, and at the end of twelve weeks following the exposure, they had completely healed. There was slight recurrence after three months' interval.

Orthoform is a methyl-ester of amido-oxybenzoic acid, and is insoluble in water. It is usually employed as a dusting powder or an ointment to allay pain in ulcers and burns. Occasionally it causes severe irritation and sloughing. We know that molecules are constantly breaking up and reforming in the body, under the influence of many physical forces. When atoms disintegrate, electrons (negative units), or positive corpuscles or both, may be liberated. Both the x-ray and radium are able to effect alterations in elementary substances and in simple and complex organic and inorganic compounds. The chemical change is one of oxidation; the physical process is atomic as well as molecular and is through the process of ionization.

SUMMARY

The rapid healing of long standing ulcerations of the skin caused by erythema induratum (Bazin) and following the local use of 15 per cent orthoform ointment and the therapeutic use of the x-ray is discussed. No healing occurred until local destruction of the tissues was secured through the combined effect of the orthoform and the x-ray. This favorable result would suggest the use of the x-ray and various irritating and stimulating chemicals, in regulated amounts, in order to secure local reactions in some forms of chronic ulcerations of the skin.

SOME USEFUL ELECTRODES FOR ENDOTHERMIC SURGERY*

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Quite frequently, in the course of treating many lesions in the body orifices, I find it difficult to reach distant lesions with the usual type electrodes, and to protect the surrounding tissues from accidental burning by chance contact with these electrodes. Moreover, in cases where metal retractors, specula or other instruments are used, the customary electrodes are apt to spark across to the metal and burn the patient. In addition, there are certain other objectionable features that bear mention.

The ordinary round needle type electrode does not make fine cuts and, besides, it chars severely the surrounding tissue area. The usual round, ball-type coagulating point does not distribute the heat in sufficient amount to give a uniform coagulation effect and carbonizes readily. The regular type wire-loop snare is usually weak, non-rigid, breaks easily, or burns through when charged with the high frequency currents.

Through the courtesy and cooperation of Mr. Stoyer of the Peerless Electro Medical Corporation, I was able to have prepared for me a set of electrodes described and illustrated herewith, and which, in our practice, successfully overcomes all the drawbacks of the ordinary types, and offers a very convenient aid in the use of high frequency currents.

These electrodes are all of high carbon steel with a solid shaft to the cutting point, the shaft being covered with a solid layer of lacquered bakelite. This covering insulation prevents short circuiting, sparking or burning when in contact with other metal instruments or surrounding tissues. The electrodes are long enough to make readily accessible with ease and safety distant lesions in the mouth, throat, bladder and vagina.

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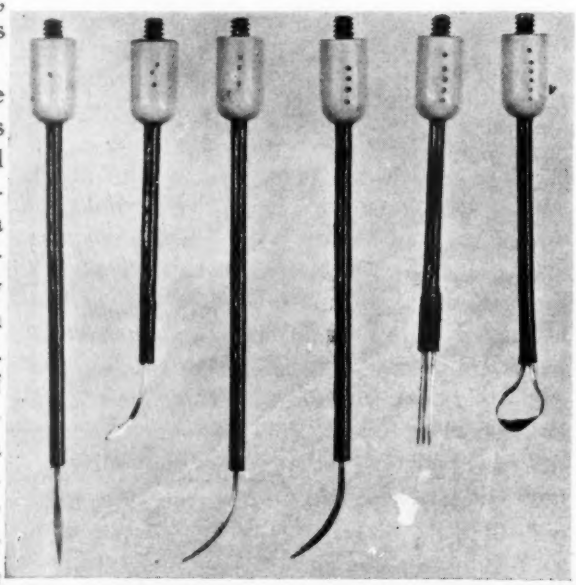
55 East 86th St., New York City.

The various shapes of the cutting needles allow for fine cutting with minimum charring, and render it easy to get around tight corners such as occur in the mouth. The three-point coagulation electrode increases the heat in the lesion under treatment at the point of contact, and effects a wider, deeper and more uniform coagulation.



1. Cutting. 2. Arrow Point. 3. and 4. Curved Lance. 5. Threepoint and Coagulation. 6. Rigid Scoop Loop Curet.

The curette shape electrode replaces the old type, thin wire loop. It fits easily around and under a lesion and is particularly useful in the removal of pedicle lesions. It never slips, it coagulates as it cuts and is firm enough to carry along the excised portion of the tissue, serving as a very useful electrode for doing biopsies, and for scooping out a cavity, or coring out a cervix.

PHYSICAL THERAPY CLINICS

X-RAY THERAPY*

DOSAGE, BIOLOGICAL LAWS AND TREATMENT METHODS

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In this article it is my intention to confine myself entirely to practical problems, and to consider these problems from a practical point of view.

One of the most intricate problems the x-ray therapist has to deal with is the problem of dosage. Prior to administration of any treatment, the erythema dose should be established, no matter whether one intends to administer small, fractional doses or to give large, massive treatments. The erythema dose is the practical, biological unit for the x-ray treatment work.

However, right here the question arises, whether the individual ED for every patient, or a general ED for the average patient should be determined. In a previous publication[1] I have shown that large individual variations occur, on account of age, complexion, diseases and other undetermined causes. In spite of these normal and abnormal variations there is still a possibility to determine the average ED, and to expect variations from this average, under certain conditions.

There are several ways of establishing the ED. A simple way is to expose a few small areas, usually of the arm, to a series of different exposures. Of course, one has to take into consideration the scattering, which depends upon the irradiated volume of tissue and which reaches large figures in the deep therapy of chest and pelvis. Although one can establish and control the ED by the foregoing experiments or by the usual clinical observations, several physical methods have been developed which enable us to determine these reactions in advance, and to develop a system of treatment conditions that will produce the desired biological reactions.

One method is called the indirect method; it starts from the mechanical and electrical factors, and derives the erythema dose by use of a formula. Several years ago[1] I critically studied the existing formulas and have developed a simple very comprehensive formula for the determination of dosage. The formula can be used also for the determination of the time to cause a certain biological effect. The formula reads:

$$D = \frac{Spgp^2 \times MA \times T}{FSD^2 \times (n+2)^2} \text{ or } T = \frac{FSD^2 \times (n+2)^2 \times D}{Spgp^2 \times MA}$$

for a very mild erythema. If D comes out equal 1 it represents an erythema dose; every other resulting figure represents a multiple or fraction of the erythema dose. Spgp and FSD should be measured in identical units, cm or inches, T in minutes. n represents the mm thickness of al.

For a stronger erythema dose one has to insert $(n+2\frac{1}{2})^2$ or $(n+2)\times(n+3)$ instead of $(n+2)^2$.

The formula can be used for copper filtration by setting

$n = 8$ for $\frac{1}{4}$ Cu + 1 Al
$n = 10$ for $\frac{1}{2}$ Cu + 1 Al

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n = 12 for ¾ Cu + 1 Al
n = 14 for 1 Cu + 1 Al

As an example we may figure out:

6″ Spgp
5 MA
0 Filter
8″ FSD
T = 1.5 min
D = ?

$$D = \frac{6 \times 6 \times 5 \times 1.5}{8 \times 8 \times 2 \times 2} = 1.05 \text{ or } 1 \text{ ED.}$$

or

8″ Spgp
5 MA
3 mm Al
10″ FSD
D = ¼ (ED)
T = ?

$$T = \frac{10 \times 10 \times 5 \times 5 \times \frac{1}{4}}{8 \times 8 \times 5} = 1.95 \text{ or } 2 \text{ min.}$$

With a simple formula like this one cannot expect very accurate results, because a few factors are neglected, which affect the dosage more or less (particular tube, transformer, rectification, size of exposed area). In order to arrive at more accurate results one has to use the direct method, which measures the intensity of the rays, just where they reach the skin. A large number of methods have been worked out and a number of units have been introduced for this purpose. The following chart[1]* gives you the most important ones.

DOSAGE

Direct Method—Exact — Absolute Arbitrary Units

Unit	Method	Instrument	Introduced, Improved by	Erythema Dose, Rays Soft	Hard
H	Chemical, Color changes	Pastilles, Radiometer and others.	Holzknecht, Sabouraud, Noiré	5	about 25
X	Photographic changes	Quantimeter	Kienboeck	10	about 25
F	Electrical resistance changes	Selenium cell intensimeter	Johnston, Fuerstenau	20–50	100–200 variable
r	Ionization	Electroscope Iontoquantimeter	Szillard, Friedrich, Behnken	300–600	500–700

is the quantity of X-radiation which, when the secondary electrons are fully utilized and the wall effect of the chamber is avoided, produces in 1 ccm of atmospheric air at 0° C and 76 cm Hg such a conductivity that 1 electrostatic unit is measured at saturation current.

Indirect Method—Approximate

Bachem Formula for Approximate Dosage

$$D = \frac{SpGp^2 \times MA \times T}{FSD^2 \times (n+z)^2}$$

Time

$$T = \frac{FSD^2 \times (n+z)^2 \times D}{SpGp^2 \times MA}$$

D = 1 ----- Mild erythema dose;
SpGp and FSD in identical units, cm or inches;
T in minutes

n = mm Al filter.
for Cu filter: ½ Cu + 1 Al ---- n = 8; ¾ Cu + 1 Al ---- n = 10; 1 Cu + 1 Al ---- n = 12; 1 Cu + 1 Al ---- n = 14

Examples:

6″ SpGp, 5 MA, 0 Filter, 8″ FSD, T = 1.5 Min. $D = \frac{6 \times 6 \times 5 \times 1.5}{8 \times 8 \times 2 \times 2}$ = 1.05 ∽ 1 ED

8″ SpGp, 5 MA, 3 mm Al, 10″ FSD, D = ¼ ED $T = \frac{10 \times 10 \times 5 \times 5 \times \frac{1}{4}}{8 \times 8 \times 5}$ = 1.95 ∽ 2 Min.

Chart I.

While the older units are arbitrary, the newly introduced r is an absolute unit, expressing the x-ray intensity by the fundamental electrical or even mechanical units. By establishing the ED in this unit a controversy developed as to whether the same number of r was required to cause the same reaction with hard and soft rays. Several authors, Wood, Holthusen, and Packard, claimed that identical figures caused the same reaction; others, Glasser, Mayer, Wintz, and Bachem, found that less soft rays, than hard rays, measured in r, were required for the same reaction. So, for instance, I found figures from 480 R for unfiltered rays to 660 R for cu-filtered deep therapy rays, for producing a mild erythema.

This discrepancy between the observations of various authors was explained recently in a very interesting publication by Glocker, Hayer and Juengling. These authors could demonstrate that with small doses, soft rays cause a stronger reaction than hard rays; on the other hand, with large doses the difference nearly disappears. Therefore an erythema starts with a lower dose for soft rays (less than 300 R) and with a larger dose for hard rays (more than 300 R); a pronounced reaction however occurs for practically the same amount of radiation (about 900 R). The range of an erythema therefore is larger for soft rays than for hard rays.

These observations explain that authors working with small doses find a difference between hard and soft ray dosage, those using larger doses find identical dosage.

My figures hold for a mild erythema and show the difference between hard and soft rays.

My formula also, which I developed several years ago, takes care of the wider range of a soft ray erythema. Using the factors 2^2 and $2\frac{1}{2}^2$ for unfiltered rays, and for a very mild and a stronger erythema, the respective doses show a difference of 56%; for filtered technic (6 mm al) the difference between 8^2 and $8\frac{1}{2}^2$ amounts correspondingly to 12% only; for cu-filtration the variation becomes still smaller.

From these figures we may draw the practical conclusion that hard rays require a more accurate dosage than soft rays. In addition to this there are more massive and more strong doses given and larger volumes treated with hard rays (deep therapy) than with soft rays (skin therapy). In these facts we may see the ex-

planation for the more empirical work of dermatologists and the more accurate work of the deep therapists. These facts suggest why in deep therapy more standardizing work is done to establish dosage, and why the direct, measuring method is preferred to the indirect, calculating method.

A complete standardization of a deep therapy outfit should consist of the following items:

Exact measurement of voltage, with corrections for altitude;

Control of tube behavior as to taking of voltage, amperage;

Development of a treatment scheme of about 5 steps, from unfiltered to deep therapy radiation, with particular attention toward tube safety and time economy, effected by proper voltage, amperage, filtration, distance.

This scheme should include the listing of all technical and physical factors which secure an exact control and reproduction of the treatment conditions: rheostat, autotransformer-settings, primary voltage, etc.

The erythema time should be determined for each of the qualities.

The quality of each radiation should be defined by λ eff, μ, or best by the approximate distribution of the radiation through the tissue.

An approximate scheme should be laid out for the treatment of various diseases, based upon the depth of the tissue and upon the required effective dose.

The effective dose, that the tissue in question should receive is determined by three biological laws:

(1) The rule of Arndt and Schultz, which correlates the biological effects to the quantity of the administered dose, can be applied to the x-ray as follows:

Cell destruction may occur after heavy radiation, with the result that the function of certain organs is abolished or profoundly modified. Later effects, such as phagocytosis of necrotic material, connective tissue proliferation, strangling of malignant cell groups and their replacement by connective tissue follow the period of destruction.

Inhibition of cell activity, for instance its secretory or proliferating activity, occurs with milder doses, short of those having a destructive effect on the cells. The cells may return to their normal activity after a certain time.

With very mild doses no bionegative effects can be observed, but biopositive reactions occur, like an increased cell metabolism, growth or function. Whether this is a direct or indirect response to the radiation is still a matter of speculation.

(2) The law of Bergonie and Tribondeau emphasizes that embryonal, undifferentiated tissues are more sensitive to radiation than those tissues which have acquired fixed, adult characters, and that cells in an active state of function and division are more susceptible than those in a more inactive or dormant state.

(3) Finally a new observation of Holthusen is of great importance, as to the application and size of the dose, namely that inactive, dormant cells accumulate the effects of fractional treatments; that fast growing and dividing cells, however, have no or little accumulative power.

The knowledge of these laws explains the fact that roentgentherapy is a widely useful measure in the treatment of diseases. In the following is given a comprehensive list of the purposes and conditions for which use of the x-rays is made, for cure or amelioration, by themselves or in connection with other therapy:

(a) *Dermatology.*

1. To remove hair. Tinea tonsurans or ringworm of the scalp. They should not be used for hypertrichosis. Used also in Favus.

2. To decrease size or to diminish activity. Comedones or blackheads, acne vulgaris, acne rosacea, and seborrhea.

3. To decrease activity of coil or sweat glands. Hyperidrosis or excessive sweating of localized areas, such as the palms and soles.

4. Although there is no evidence that they may destroy bacteria in tissue in ordinary dosages, they may at times be used with some good effect in sycosis barbae and parasitica and in lupus vulgaris.

5. Small doses may be successfully applied where it is desired to stimulate the skin metabolism. Chronic indurated eczemas, lichen planus, psoriasis and almost anywhere that a chronic, sluggish, indurated condition obtains in order to initiate an absorption of exudates and infiltration.

6. Their use to destroy diseased tissues without unfavorably affecting the normal tissue which is involved is the principle of their application in skin malignancies, and other conditions of low resistance, carcinoma, sarcoma, tuberculosis, fungus diseases, such as blastomycosis and sporotrichosis, mycosis fungoides and certain entities on a tuberculous basis such as erythema induratum.

7. They are often used to allay pain and for their antipruritic effect in malignancies and inflammations and almost anywhere that itching is present. The dosage in this latter group is usually small.

(b) *Deep Therapy.*

1. Carcinomata, particularly of the female sex organs, including the breast, sarcomata, especially lymphosarcomata, lymphogranulomatosis (Hodgkin's disease), mediastinal and cerebral tumors, and many other malignancies and their metastases can be benefited by the x-rays. In connection with surgery pre- and postoperative treatments are given to render malignant growths operable and to prevent recurrences.

2. The various uterine hemorrhages, myomata under certain conditions, and osteomalacia are favorably influenced by x-ray treatments which cause a temporary or permanent sterilization.

3. Leukemia and polycythaemia can be benefited by the treatment of the spleen and the long bones.

4. The value of x-radiation has also been established for hypertrophied glands, such as the thyroid, thymus, prostate, hypophysis, for tuberculous glands, joints, sinuses, and under certain conditions pulmonary tuberculosis; for many acute and subacute inflammations and suppurations, such as osteomyelitis, pneumonia, inflammation of the female sex organs, etc.

For the treatment of these and many other conditions several methods have been worked out, each of which finds its proper place in the treatment of certain diseases:

Unfiltered rays, produced by low kilovoltage are used for all superficial work (skin diseases); lately the Grenz rays were introduced by Bucky, Eller and Glasser, produced by extremely low kilovoltage, transmitted through Lindemann glass, and causing reactions which differ somewhat from those produced by ordinary x-rays. Al-filtered rays are used for medium therapy, cu-filtered rays for deep therapy, with large focus skin distance, in order to secure a good distribution through the tissue. (Dessauer, Perthes.)

Large doses are applied for squamous cell carcinomata, neurofibromata, and most sarcomata; medium doses for basal cell carcinomata, lymphosarcomata, Hodgkin's disease, blood diseases, hypertrophied glands, tuberculosis and sterilization purposes; small doses for pulmonary tuberculosis and the acute and subacute inflammations. (Kroenig, Friedrich, Seitz-Wintz, H. Schmitz.)

Massive treatments (Wintz, Warnekross) are given in very active malignancies. On the other hand fractional doses (Freund, Holzknecht) are applied for prophylactic purposes against recurrences (Holthusen), as palliative treatment in far advanced malignancy and Hodgkin's disease, blood diseases and inflammations (Heidenhain), and if severe local effects or systemic reactions (roentgen sickness) are to be avoided.

Large areas must be treated in cases of extended growths and metastases (Walthardt, Dessauer's homogeneous therapy). The radiation should be concentrated upon a small area on localized growths (Holfelder and his "Field selector").

One portal is sufficient for the more superficially situated diseased areas, sometimes with over-exposure and large focus-skin-distance (Wintz's distant field). Multiple portals are re-

quired for very deep-seated areas which require heavy dosage (cross-fire method).

TREATMENT SUGGESTIONS

Qual. ity	KV Dep.	mm filter	Inches PSD	Erythema time	Penetration	Disease	Treatment
I	100 6" (or less)	0	8 for small areas 14 for large areas	14min (with 5MA) 43min	About 50% in 1 cm. Depth dose 5%	Eczema, derm pap cap Eczematoid ringworm Lichen simpl, chron, plan Psoriasis, pruritus Acne (angioma) Tinea, sycosis, favus Sen. keratosis, leukoplakia Rodent ulcer Squam cell epithelioma	¼ ED weekly Face ⅛ ED weekly Infants ⅛ ED weekly Avoid visible reaction or II Scalp Chin overlapping fields ⅕ ED 1 ED, 1-2 ED, 2 ED repeat after 6 weeks or II or II
II	120 8"	2 Al (or less)	8 or 14	3.2min (with 5MA) 10min	About 70% in 1 cm. Depth-dose about 10%	Keloids Furuncles, carbuncles Lupus, scrophuloderma Hyperhydrosis Warts, corns	½ ED followed by ⅛ ED weekly, avoid strong reaction followed by ⅛ ED every 1 or 2 weeks 1ED, repeat after 6 weeks
III	140 10"	4 Al (or 3)	.14 (or less)	14min (with 5MA)	About 65% in 1 in. Depth-dose about 15%	Enlarged thymus Goiter: simple, exophthalmic Rhinoscleroma Tb: adenitis, peritonitis, pulmonary	⅛ ED every 1 or 2 weeks ⅛ ED every week ¼ ED every 2 weeks ⅛ ED every week Care Erythema Care Fever!
IV	170 12" (or 140 10" with smaller apparatus)	½Cu + 1Al ½Cu + 1Al	20	55min (with 5MA) 115 min	About 80% in 1 in. Depth-dose 30-35 %	(Hypertrophied prostate) Uterine: hemorrhages, fibroma Tb: joints, bones, sinuses Polycythemia Leukemia Hodgkin's Lymphosarcoma Ca: glands, breast, cervix	⅛ ED every 2 weeks ⅛, ⅕, ¼ ED at ovaries cross fire ant., post. Sterilize: Temp. Perm ½, ¼ ED ½ ED long bones Cross fire Repeat according to blood cnt ⅛-½ ED spleen ⅛ ED, 1 gland at a time repeat according to clin. picture ½-¾ ED, repeat 4-6 weeks 1-1½ ED, repeat 6-8 weeks
V	200 14"	½Cu for ½ + 1Al	20 (or more)	80min (with 5MA)	About 85% in 1 in. Depth-dose 35-40 %	Ca: uterus, ovaries, rectum, etc active, dormant Sarcoma	1 ED at depth, Crossfire or more by X + Ra Within 7-10 days Repeat after 3 months 2 ED accumulated over ½ yr 1 ED or more, repeat after 2 mo. Sturtevant Method

Chart II.

The fields should be well localized, if heavy doses are applied, particularly with the cross-fire method, in order to protect the tissue in a relatively small depth. Overlapping fields are required for the homogeneous irradiation of curved surfaces, e. g., for the depilation of scalp or bearded region (Adams, Kienboeck).

This large number of treatment methods enables the radiologist to select the proper method of application for each individual case. It shows that there is no justification for a schematical treatment of all cases which present themselves, by a cut and dried method.

Chart 2* shows a scheme which is based upon the principles, developed above, and which incorporates most of the items covered in this lecture.

LITERATURE

(1) Physical and Biological Observations about Skin Reactions. A. Bachem, Radiology, Sept., 1927.

*The charts are taken from the Roentgen Ray Chart of Dr. Bachem's and Dr. Kobak's 6 Physical Therapy Charts.

EDITORIAL

ARCHIVES OF PHYSICAL THERAPY

1930 Annual Meeting in St. Louis.

PRESIDENTIAL ACCEPTANCE ADDRESS*

NORMAN EDWIN TITUS, M.D.

NEW YORK, N. Y.

Members of the American College of Physical Therapy and Guests:

It is indeed with great pleasure that I assume the office of President of our organization. After a critical survey of existing physical therapy societies in America, I am convinced that this organization in its short, but brilliant existence has already taken national leadership. Our membership has steadily increased, our programs have been purged of the fanatic papers written by over-enthusiasts, which have been replaced by scientific addresses that bear the stamp of conservatism. Our finances, having been investigated by a certified public accountant, have been found to be satisfactory. Our leadership and prosperity have been won in a competitive field. We have reason for self-congratulation.

This meeting of our organization is what is hoped will be a turning point in our career. Objections have been raised to the name of "College," inasmuch as that implies an institution devoted to teaching. The American Colleges of Physicians and Surgeons are patterned after the English societies known as the Royal College of Physicians or Surgeons, but the necessities for such organizations in this country are not as they are in England. As you know, in England anyone can practise medicine without even going to medical school, and the government has no hand in licensing practitioners. The only requirements for a man to practise are that he pass the examinations and become a Fellow of the Royal College of Physicians or Surgeons. Hence these organizations do not correspond with the American idea of college. Objections based on the foregoing facts, have been raised by many people to our title as the American College of Physical Therapy, and the Board of Trustees believes it proper that we change our name this year and expand our policy to become a more truly national organization.

There are at present scattered societies in New York City, Boston, northeastern Pennsylvania and New Jersey and elsewhere. To make more unified the professional intercourse of the practitioners engaged in physical therapy, it is the sentiment we should change our name to the American Congress of Physical Therapy and make an effort to have a supervising organization composed of representatives of different state societies. In this manner we could enlist the interest of a number of groups working in harmony, and insure against administration by one faction and do away with internal squabbling which has so hurt other physical therapy societies in the past. A congress made up of component societies would be fortunate in that all the papers presented before the congress by men from the different sections of the country would be approved by the society of which the latter was a member. As an example, here in Chicago there is no way of knowing that Dr. X of Boston is

*Read at the Eighth Annual Meeting, American Congress of Physical Therapy, Chicago, Nov., 1929.

capable of writing on the subject that he wishes to read before the Congress meeting. Before his paper could be proposed for the Congress program, it would have to be passed upon by the Program Committee or the Board of Trustees of the Boston society, and then, if they stamped the paper as worth while, there would be no delay in getting Dr. X on the program of the Congress, even if the meeting were held in Denver or Shrevesport, La. In this manner our programs would be made up of papers by the outstanding men in each section of the country. It would also give men who were not members of the Congress an opportunity to read papers by submitting them to the local section of the Congress for its approval. Undoubtedly many men with a smattering of knowledge of physical therapy would welcome the opportunity of having their papers discussed at the Congress and endorsed by the local section.

This organization has had sufficient experience to be able to budget the expenses of a meeting. Our records now show the cost of preliminary and final programs, we have a most efficient full time, paid secretary with an office in Chicago, and the general expenses of stationery and postage could be easily estimated and the expenses budgeted in the main office of the Congress, such as, undoubtedly, the expenses of the meeting of the American Medical Association office here in Chicago are budgeted. When this amount is estimated, and if there are in the component societies, say, one thousand men, each component society would be expected to contribute from its membership dues such proportion of the budget expenses as there are members. As an example, if the New York society had two hundred members and the expenses of the national congress office were $4,000 with a thousand general members, the New York society would be expected to pay $800 to the national organization. It would not be a great drain on any one society and the burden would be borne in proportion to the membership. As the meeting time comes each year the programs could be arranged in Chicago, and the physical details of the meeting, place and accommodations could be handled by a local committee in the city in which the meeting is to be held.

There is no reason why a local Chicago or Illinois society could not be formed as could one in Wisconsin, Indiana, Kentucky, Missouri, Ohio and other states. If there are only ten men in the society in the beginning, they would only have to pay ten parts of the expenses. It would take but one meeting of the Congress, which I hope can be held next year, to give the whole organization sufficient publicity to bring in hundreds of members.

With these ideas in mind, I ask that you seriously consider at the business meeting changing our name to the American Congress of Physical Therapy. Let us all get together to make this the biggest organization of its kind in the world. Each man will have a direct part to play in the national organization, each society will have its elected representatives, and in a very short time I predict we will be able to develop section meetings which can be called independent of the national meeting or just before the national meeting in the same place.

This may be called an outline of a policy that many of us greatly interested in the organization have mapped out, but this policy cannot bear the fruit we desire by just changing the organization. We must have personal effort on the part of every single individual in our association.

We all know that every form of therapeutics has to go through an empirical stage, and coordinated education and interest in any field of therapeutics lifts it from the field of empiricism into the field of rational therapeutics. If we even consider a greater unification of purpose of the policy before mentioned, should we not also consider a still greater unification in an effort to make physical therapy as rational as is humanly possible?

Undoubtedly it is early to expect that large sums of money and large amounts of time will be devoted to the scientific investigation of physical therapy. The demand for such investigations must by created by sterling clinical contributions before the wherewithal can be expected from outside sources. We can only create wholesome interest in the subject by demonstrating on a conservative basis its logical and in-

telligent usefulness. We owe a debt of thanks to the Board of Trustees of the American Medical Association in that it has taken the leadership and formed the Council on Physical Therapy. This Council will soon make itself felt as the leading spirit in the movement to elevate physical therapy from the empiricism to the higher stage of rationalism.

There are too many men in the country sufficiently versed in physical therapy to excuse shotgun prescription. I mean by this, in the past many men have taken a chance on treating some condition with physical therapy with the hope that the treatment might do some good. Even the practitioner in the smallest town should realize he is under observation and criticism. Taking a "chance" on possibly producing a desired result in a patient is practicing medicine in a medieval manner. It retards progress and leads to adverse criticism. Since it is admitted that physical therapy is not a cure-all, but an adjuvant to other measures, our cases should be properly selected. Those of us who work in large hospitals all know that our successes are very rarely spoken of by the staff. Once in a while a fair minded member of the staff will express appreciation for good work; most of them hold back favorable comment and await our failures with pleasurable anticipation.

It therefore remains for us as members of this organization to restrict the use of physical therapy to such condition as we conscientiously feel will be benefited. This is not unfair to the patient, because many a surgical case has terminated unfavorably because in the mind of the surgeon operation was not indicated. Consequently why should not we, in building up true, rational physical therapy, adopt an attitude of mind of first considering contra-indications before thinking of the possible indications?

We all know numerous examples of strange conditions being treated on a slight chance of physical therapy doing the patient good. Let us hold back physical therapy from these cases unless we are convinced that it is absolutely the proper procedure. Let us constitute ourselves as the judges to be judged by our fellow members whether or not we should use physical therapy. When we are right and can defend our position against all comers, then let us institute the procedures we feel are correct. Let us all unite in an effort to lift physical therapy from the field of empiricism and work towards placing it in a position of rational therapeutics.

Many writers speak of the triad of therapeutics—medicine, surgery and physical therapy. That is a wonderful idea and undoubtedly true in the future of therapeutics but frankly I do not believe we have yet gained the position to include ourselves on a level with medicine and surgery as a triad of therapeutics. There is no reason why we should not gain this position, but we can only rise to it by conservatism and intelligence. It must be admitted the training of the medical man today is far superior to the training of years ago. His judgment should be such as to keep him from being carried away by the wave of over-enthusiasm that has reacted like a boomerang to physical therapy in the past.

The medical profession today is unable to take the stand that physical therapy is not a necessary part of complete therapeutics. Therefore, gentlemen, do not become so enthusiastic that you can only talk physical therapy. Do not try to force it down the throats of colleagues who do not believe in it as you do. Such actions do not promote cooperation between medicine or surgery and physical therapy. Let us realize that in trying to establish physical therapy as rational therapy we should assume the attitude of a child and that is, we should be seen and not heard; listen to the discussions of men in other branches of therapeutics and when asked what we can do, explain in the most conservative manner and talk about only that of which you are absolutely sure. Let the year 1929 mark a change in physical therapy from over-enthusiasm to ultra-conservatism and let us work along these lines with a real national organization such as is this American Congress of Physical Therapy.

OFFICIAL NOTICE OF CHANGE OF NAME

The American College of Physical Therapy becomes the American Congress of Physical Therapy with the beginning of 1930. Pursuant with plans which have been formulated for the

future conduct of the organization and to give it a wider scope in its usefulness to the medical profession, this decision to change its name was unanimously passed at the last annual session. Plans are now being perfected to make the Congress a central organization for physical therapy units throughout the continent. It has never been the desire of maintaining a college in any sense of the word. Organized primarily to promote the scientific interests of physical therapy and to have an open door to all regularly licensed physicians in good standing in their county societies, the Congress is best suited to carry out the original ideals.

The American Congress of Physical Therapy is now entering into its ninth year of progress. Its popularity in the profession is best attested by the unusual successes of its annual meetings and the continued efforts to maintain the high standards which rightfully belong to any scientific branch of medicine. The American Congress of Physical Therapy plans for even bigger things in the near future. Constructive programs to demonstrate the worthiness of the organization to hold a place with other scientific bodies will shortly be announced.

EDUCATION AND TRAINING IN PHYSICAL THERAPY A NEGLECT OF MEDICAL SCHOOL ADMINISTRATION

While physical therapy has marked progress with the other advances of medicine and surgery, there is a gap which still exists with reference to the training of physicians, technicians and others who are interested in the subject. The attempts of some medical schools to organize systematic courses have met with varying degrees of success, but in general, the difficulties of obtaining good instruction in recognized institutions is still as great today as it was several years ago.

The busy physician desires and is entitled to facilities which should enable him to obtain clinical instruction in physical therapy in a comparatively short period of time. A four weeks' course is adequate as a stimulus. If supplemented by guided collateral reading of standard texts and literature, this period should prove to be a post-graduate education well worth while. Every possible alibi has been foisted on the medical profession by some institutions which should long ago have included in their curriculum a systematic course in physical therapeutics. The manufacturer of electrotherapeutic equipment, who at one time accommodated the doctor by teaching and demonstrations, long ago yielded to the requests that teaching should be left to educational institutions. The manufacturers discontinued their educational programs on the promise that the universities would offer the necessary instruction. Some teaching faculties have proceeded to carry out their promises. Others, instead of organizing courses, are still debating among themselves whether physical therapeutics is a recognized branch of medicine and surgery.

For the technician, much the same situation exists. The demands for schooling are increasing. Properly qualified individuals, eager to advance themselves in this newer field, are limited in their choice of a few schools where acceptable training is to be had. Or, if fortunate, they are given practical instruction by one or a group of physicians who are employing physical agents in their practice. The fundamentals cannot be properly taught in a doctor's office, and self-reading hardly proves interesting and understandable at all times. The situation is one which requires careful consideration on the part of leaders in physical therapy.

There has been all sorts of propaganda by organizations hopeful that in this way some action would result. Symposia and discussions have consumed full days, but the correct end result is still lacking. One wonders whether the manufacturer would be unwise to resume the former practice of teaching. One wonders, too, whether private courses, properly supervised, would not awaken some interest on the part of school administrators who are always complaining that the curriculum is overcrowded. There is no resistance now. Physicians are anxiously awaiting to hear recognized institutions offering comprehensive courses on a postgraduate basis.

Physical therapy is here to stay. No one will dispute this fact. Regular medicine has or-

dained it a place on the same basis as other branches of therapeutics. Modern technicians demand that the older physician who does not possess the necessary qualifications to treat with light, heat, electricity, massage and medical gymnastics, equip himself with sufficient knowledge to prescribe these agencies when they offer quicker and better results than orthodox methods. This knowledge must be conveyed on a practical basis. The busy family doctor demands systematic clinical instruction. It is a common thing for physicians to travel to European clinics for training in the respective specialties. Until a very few years ago, this was a necessity. Our medical institutions have learned their lesson. Endowments are being put to use and excellent post-graduate instruction is now obtainable here. Will the American doctor have to travel to Europe for a training in physical therapeutics? Or will medical faculties take cognizance of this neglect of which they have been guilty?

BRITISH RADIOTHERAPY FOR CANCER

The striking advance which radiology is making in the treatment of cancer in Great Britain was ably pointed out in an article published in a recent edition of the London Times.

According to the article, the Middlesex Hospital Radiologist has been guaranteed five beds for seven years in order that cancer patients who wish to avoid surgical operation can have radiological treatment, if such treatment is considered advisable. Hitherto, cancer patients at Middlesex Hospital have been routinely classed as surgical cases, being passed on to the radiological department only at the discretion of the surgeon.

The arrangement by which patients can go direct from their own medical adviser to the radiological department is not only a recognition of the growing importance of radiological treatment, but also marks a step forward in the closer cooperation between surgeons and radiologists in England.

In a recent article in the Lancet, Dr. J. H. Douglas Webster, physician in charge of the radiological department at Middlesex Hospital, commented as follows upon the subject:

"The ideal method is for all new patients with malignant disease to be seen by the surgeon and radiologist in consultation. As a rule, however, the purely surgical view prevails, and radiotherapy is considered merely as an adjuvant to surgery—to be employed only when surgical means have failed, as surgery was once regarded by medicine. Radiotherapy has now become a new specialty of method, and there is much to be said in favor of giving the radiologist, as a cancer therapist primarily, a status of real equality with his other hospital colleagues."

In conclusion, the article mentioned that Dr. Webster's discussion substantiates the opinion of other authorities who have also pointed out that the reluctance of patients suffering from cancer to consult a doctor is often due to the fear of an operation, and that a wider recognition of the benefits of radiological treatment in the earliest stages of cancer would undoubtedly be an important contribution to the national campaign against the disease.

EXHIBITION AND ANNUAL MEETING

Wednesday, December 4

Exhibition opens.

Official opening by the Rt. Hon. Arthur Greenwood, P.C., M.P. (Minister of Health).

10th Mackenzie Davidson Memorial Lecture by Professor Gosta Rorssell. Subject: "Radiotherapy of Malignant Tumors in Sweden."

Meeting of medical members, when Dr. G. B. Batten will open a discussion on the following subject: "The Requirements of Clinicians from Radiologists and Vice Versa."

Luncheons served daily at the Central Hall between 12:30 and 1:30 p. m.

Thursday, December 5

Exhibition opens.

Discussion (with opening papers) on "Aspects of Radiation Therapy."

The following have already consented to take part: Professor S. Russ, Mr. Geoffrey

Keynes, Dr. M. Donaldson, Dr. J. E. A. Lynham and Dr. N. S. Finzi.

Discussion continued.

Professor F. L. Hopwood, D.Sc., and Miss F. E. Smallman, "The Use and Abuse of Radium Needles."

12th Silvanus Thompson Memorial Lecture by Professor A. S. Eddington, F.R.S. Subject: "X-rays in the Stars.

Exhibition closes.

Members are invited to bring friends to the exhibition and to any of the meetings.

Friday, December 6

Exhibition opens.

Technical papers:

(1) "A Single Valve Plant for Diagnosis and Deep Therapy," Mr. W. E. Schall.

(2) "A Mobile X-ray Unit," Mr. Cuthbert Andrews.

(3) "Modern Radiological Developments in Germany with special reference to the new Institute at Frankfurt," Dr. Ffrangcon Roberts.

(4) "Output of Transformers under different methods of High Tension Rectification," Dr. A. Orliansky.

(5) "A Hot Cathode Tube with Rotating Anode," Mr. W. R. Gray.

(6) "The Mekapion, an Ionization Apparatus for the Absolute Measurement of X-ray Dose," Dr. E. J. H. Roth.

Papers and demonstrations from the Radiological Section of the Stranegways Research Laboratory. Papers:

(1) "Tissue Culture and its Application to Radiological Problems," Miss S. F. Cox and Dr. F. G. Spear.

(2) "The Action of X-rays on Living Cells Cultivated *in vitro*," Miss S. F. Cox.

(3) "The Immediate and Delayed Effects of Radium on Tissues Cultivated *in vitro*," Dr. F. G. Spear.

Exhibition closes.

Annual dinner at the Trocadero restaurant.

DR. HAROLD E. CARNEY

Attention is directed to the members of the accidental death of Harold E. Carney, M.D., Monroe, La., who was killed on the morning of November 6th, by a passenger train hitting his automobile.

Condolence is offered to his family and friends.

EIGHT-HOUR DAY FOR X-RAYS

According to the Evening Standard of October 31, Budapest physicians may soon be permitted to give x-ray treatment only between midnight and 8 a. m. The postmaster-general claims that the reception of wireless messages is constantly being disturbed by the electric waves emitted by the many x-ray instruments in the Hungarian capital. He demands a limitation of this kind of treatment. Physicians and patients are protesting against this, and argue that the interests of medicine are superior to those of wireless.

It is of interest to note that all radio interference can be completely abolished by the installation of the valve tube type of rectification.

MME. CURIE

Mme. Curie landed on October 15 at La-Havre from the liner Ile de France, bringing with her a cheque for $50,000 presented to her in America for the purchase of a gramme of radium.

AMERICAN RADIUM

The Belgian monopoly of radium, indispensable in the modern treatment of cancer, has led to such a revolt in medical circles that it is confidently expected that American money will soon be put into radium mines in Colorado and Utah, and possibly in West Africa.

Just how cheaply radium can be produced from American ores in Colorado and Utah, will not be known until the Bureau of Mines does considerably more experimental work. Provision for such experimentation will be made in a bill to be introduced in the House this fall by Representative Edward T. Taylor of Colorado. At present, it is believed that it probably would cost at least $22,000 per gram to recover radium from American ores.

It is charged that Belgian interests produce it for $10,000 per gram, while selling it for $70,000 per gram.

In West Africa it is claimed that radium can be extracted from pitchblende for $8,000 per gram by a new German process. Efforts are now being made to interest American investors in these African pitchblende fields, it is said.—Science Service (Radiology, November, 1929).

THE STUDENT'S LIBRARY

BOOKS RECEIVED

This column is devoted to acknowledgment of the books received. Such acknowledgment must be regarded by the sender as sufficient recognition of the courtesy until time and space permit selections to be made for review.

THE TREATMENT OF DIABETES MELLITUS WITH CARBOHYDRATE DIETS. By *William Davis Sansum,* M.S., M.D., *Percival Allen Gray,* Ph.D., M.D., *Ruth Bowden,* B.S. 303 pp. Price $2.50. New York and London: Harper Brothers, Publishers.

BOOKS REVIEWED

WHAT EVERYONE OUGHT TO KNOW. By *Oliver T. Osborne,* M.D. Cloth. Pp. 313. Springfield, Ill., and Baltimore, Md.: Charles C. Thomas, 1929.

This book is written by a recognized medical authority for the lay public. "The purpose of this volume," states the author in his preface, "is to present in simple language some of the truths concerning the wonderful mechanism of the human body, and to outline some of the delicate physiologic processes which insure growth and maturity, and promote nutrition and health." To further the objective of "keeping well," nutrition foods, exercise and general hygienic rules are discussed. This is by far the most pleasing and comprehensive book written for the layman. It covers and includes an exhaustive range of subjects. Infective causes of ill health are discussed and efficient measures for prevention is mentioned. The intention is not to supersede the responsibilities of the physician, but rather to stress the importance of keeping in touch with him. It is a guide to the mother and the sick layman when to recognize disease and to call in proper help. Here is a complete health book for the physician and his families and his patients. It is a book for nurses, teachers, social workers; for schools and for libraries.

SURGICAL AND MEDICAL GYNECOLOGICAL TECHNIQUE. By *Thomas H. Cherry,* Prof. of Gynecology, New York Post-Graduate Medical School and Hospital, etc., etc. With 558 half-tone and line engravings, from photographs and pen and ink drawings by the author. Cloth. Price $8.00. Philadelphia: F. A. Davis Company, 1929.

This book is an essential departure from the usual textbooks style of presenting gynecologic technic, for it is largely limited to a consideration only of methods one may employ in the field of gynecology. The book is divided into three sections in which surgical and medical technic covers the greatest part of the book. That portion which deals with office treatment is a welcome feature and will probably appeal most to the general practitioner. The important gynecologic operations are very well described by steps and illustrated by the pen of the author. Dilatation and curettage, and the introduction of the stem pessary, included in the chapter on hernias, might preferably be transferred to the chapter dealing with uterine operations. Figures 34 and 36 being repetitions of 30 and 31, respectively, might be excluded. The discussion of radium as a part of the chapter on carcinoma of the uterus is short but nevertheless clear and precise. It is the thorough discussion of diathermy in gonorrhea and pelvic diseases that places this book ahead of other gynecologic publications. Reference to "bipolarity" in diathermic current makes room for further exception with the author. There is no polarity in this form of high frequency and it is more correct, perhaps, to refer to it as *biterminal.* Intraurethral diathermy is rightly advocated by the author for urethritis on a Neisserian basis, but this form of therapy has been found by the reviewer to be more efficacious when the indifferent electrode completely encircles the waist-belt, as advocated by Cumberbatch. It is not by virtue of the heat alone that diathermic current has therapeutic value; the stimulation of active hyperemia, followed by a greater supply of antibodies to the treated part act as favorable factors subsequent to diathermization. While the illustrations by the author himself do not come up to the standards of our well known texts, it nevertheless serves his purpose in portraying his original gynecologic procedures. There should be a definite demand for a volume of this kind, and when certain revisions are made it is destined to take its place amongst the leading books in gynecology.

INTERNATIONAL ABSTRACTS

The Treatment of Toxic Thyroid with Rays of Short Wave Length. Gage Clement. Minnesota Med. 12:682-683, Nov. 1929.

Since 1910 when treatment of the toxic thyroid by x-ray or radium was first advocated, it has gradually become more popular. This therapy is used in the majority of cases in Europe, but is not used so extensively in this country. The author quotes several prominent European physicians whose results with this particular therapy have been very satisfactory. A general survey of the results in both the United States and Europe of cures effected by x-ray and surgery show the average to be about the same in both methods of treatment.

The author describes in detail his technic of application of x-ray and radium, the effect on the metabolic rate and on the thyroid. He says that the only contraindication to radiation therapy is a large gland showing definite compression symptoms. His cures have averaged 85 per cent in four years (1921-1925).

Treatment of Acute Otitis Media in Infants and Children. C. W. Rumpf. Minnesota Med. 12:694-699, Nov. 1929.

Two hundred cases of acute purulent otitis media in infants and children, in which paracentesis of one or both ears was performed, were studied with special reference to the results of treatment. Otitis media is the most frequent and important complication of acute upper respiratory tract infections in infancy and childhood and has distinct characteristics which makes it an entity apart from the same disease in adults.

Otitis media is the most frequent and urgent cause of fever, fretfulness and certain gastro-intestinal disturbances in infancy and childhood and should be diagnosed early and accurately. Otitis media neonatorum is a frequent cause of fever and crying in the first few days of life. Prompt paracentesis in the serous stage is sound surgically, gives early relief of symptoms and best promise for rapid and uncomplicated recovery. Radiant heat is the most effective physical agent in treatment. Cleanliness and dry wiping is an advance over irrigation of discharging ears.

Specific dye therapy offers promise of more rapid clearing up of infection. Otitis media is a manifestation of a general infection which must be alleviated primarily. Prophylaxis of deafness must begin with intelligent treatment of the source—acute middle ear suppuration.

Treatment of Malignant Tumors of the Rectum by Radium and Roentgen Radiation. H. H. Bowing & R. E. Fricke. Radiol. 13:443-450, November, 1929.

The majority of the cases in the series were inoperable, due to the size and extent of the primary lesion, local metastasis, metastasis to the important viscera or the patient's poor general condition. Adenocarcinoma of a rather moderate degree of malignancy predominated. These tumors are sensitive to irradiation, although they vary in degree of sensitiveness.

In the cases selected for irradiation alone, colostomy can be placed in the background. However, if indications are definite it should be done. Colostomy splints the bowel, affords better methods of cleansing, and is an aid, although not essential to thorough treatment. Diagnosis, usually made by palpation and proctoscopic examination. In only a few cases is biopsy necessary. However, a specimen should be removed since the grading is important to both surgeon and radiologist.

The size, character, situation, and grade of malignancy of the rectal growth as well as the general condition of the patient should determine the treatment factors; a standard treatment should not be employed in all cases. As yet definite recommendations regarding the most effective treatment can not be made. The risk of treatment by radium is very small and it would seem that almost all patients should receive the benefit of individual treatment.

Radium and roentgen radiation alone in selected cases or in combination with surgical procedures will afford the best results. Every endeavor should be made to individualize treatment. Prophylactic treatment seems indicated in all cases in which adequate intervention is employed; however, it can be applied only as a careful and repeated observation.

Palliation can be expected from reducing by destruction inherent in the primary growth thus adding greatly to the comfort of the patient. Improvement consists in lessening of the rectal discharge and the pain, in the reduction of the size of the tumor and in the cessation of bleeding.

Results are in the main, encouraging. There must be full cooperation of all concerned in the care of the patient. The assistance of a competent proctologist is highly desirable from the standpoint of good results.

Cancer of the Lower End of the Esophagus and Cardiac End of the Stomach. P. M. Hickey. J.A.M.A. 93:1356-1357, November, 1929.

The usual methods of roentgen examination of the esophagus are often insufficient to detect small new

growths. The gelatin barium bougie is a delicate test for encroachment of the lumen of the esophagus and may furnish reliable data for a negative diagnosis. The barium gelatin bougie is of importance in determining the desirability of an esophagoscopy.

In the endeavor to detect early malignant lesions of the lower esophagus and of cardiac portions of the stomach all the special technics at the disposal of the radiologist should be employed. The examination of the patient in the recumbent left lateral position is often advantageous.

We should be unceasing in our endeavor to perfect our technic in the hope of making diagnosis much earlier than is now done.

Factors in Dosage Determination. H. E. Martin. Radiol. 13:338-352, October, 1929.

The determining factor in successful radiation therapy is the production of a lethal dose in all parts of a neoplastic volume of tissue. The dosage in interstitial radiation is empirical and depends on the proper evaluation of numerous factors always present in different combination in a given case. These factors are enumerated and discussed separately.

Variation in the Radiosensitivity of Epidermoid Carcinoma of the Cervix Uteri. W. P. Healy. Radiol. 13:323-325, October, 1929.

It would seem, after reading this article, that a study of the histologic structure of epidermoid carcinoma of the cervix, combined with the knowledge of the radiosensitivity of the cellular structures concerned offers a sound and satisfactory explanation for the favorable results of radiation therapy obtained in this field.

Effect of Roentgen Radiation on Certain Chemical Compounds, (a) Tyrosine and Cystine; (b) Cholesterol; (c) Acetylene and Propane. W. Stenstrom. Radiol. 13:437-444, November, 1929.

Chemical changes are produced when certain chemical compounds in solutions are irradiated with roentgen rays. The average dose per hour of radiation has been determined by the oxidation of ferrosulphate in a weak sulphuric acid solution. It was found that tyrosine in a weak aqueous or sulphuric acid solution was changed with regard to the phenol group by roentgen radiation. The quantitative relation has been determined. Some experiments have been carried out with cholesterol and compared with results obtained by other investigations. Acetylene and propane in gaseous state have been irradiated for 145 hours. It was found that much larger doses are required to permit definite conclusions.

Five-Year End Results in Carcinoma of the Breast. H. Schmitz. Radiol. 13:392-412, Nov., 1929.

A method has been outlined whereby the clinical grouping of breast cancers may be determined: such grouping is considered an absolute necessity in the prognosis and treatment. The results of treatment show that carcinoma characterized by fixation whether it is primary or recurrent, offers a bad prognosis for any method of treatment. The five-year good end-results in 107 cases of primary breast cancers were 27.10 per cent and in 143 recurrent cancers 16.85 per cent. The total five-year salvage in 250 cases was 53 cases, or 21.21 per cent.

The rules of treatment based on the clinical groups are given. Attention is drawn to the fact that radiation after operation should not be given until complete healing from the operation has occurred. An operation after a preceding radiation treatment should not be performed until after 8 to 10 weeks after such treatment. The tumor should show regression, i. e., have been rightly converted into a freely movable and limited carcinoma. The tissues of the chest wall will recover from the effects of the radiations within this time and surgical eradication now will be showing union of first intention.

Coagulation Diathermy in Cervicitis, Using a New Electrode, with an Account of the Results in 200 Cases. F. M. Ende. Amer. J. Obst. & Gynec. 17:72, 1929.

Ende reports very favorable results when cervicitis is treated by diathermic coagulation. The author believes that the dosage is more accurately gauged when both the electrodes are active, rather than the popularly employed method of the large indifferent and the smaller active electrodes. For this purpose Ende has designed a bipolar electrode, consisting of a handle carrying a tapered tip of insulating material along one side of which are placed two parallel wires that make contact with one side of the canal. The machine is properly adjusted and one inch of cervix is exposed for 4 seconds, and coagulation of the cervix takes place to a depth of 2 mm. In standardizing a machine for this work the electrode is placed into a test tube of a preparation of egg albumen (four grains of chloretone added to the white of one egg). When the machine is adjusted to the point where a coagulum forms between 1-inch of the electrode points in 4 seconds, the electrode tip is short circuited with steel wool, and the foot pedal is again depressed and the meter is now read. This machine is now considered standardized for coagulating cervical tissue in 4 seconds when one inch of tissue is exposed. The patients tolerate this form of treatment best. Following the initial coagulation treatment the cervix is packed with a proteolytic substance (enzymol) to help dissolve away the slough, and when it is separated, (usually by the fourth day) mercurochrome 5% or argyrol 20% is applied daily.

Ultraviolet Irradiation of School Children. D. Colebrook. Am. J. Phys. Therap. 6:363-374, November, 1929.

287 secondary school children of ages from five to seven, inclusive, were kept under medical observation

from the end of August, 1927, to the end of March, 1928. 101 children were irradiated by light from a carbon arc lamp with a high output of ultraviolet rays. 94 children were exposed under exactly the same conditions to a similar lamp from which radiation of wavelength shorter than 3,200 A. U. was cut off by window glass. 92 children received no irradiation. Records were kept of height and weight, of incidence and duration of colds and allied conditions, of attack rate of infectious diseases, of occurrence of chilblains, and of progress in school work. Comparison of these results shows: (a) *for control and unscreened lamp groups,* an advantage to the former group in every respect except in progress in school work in which the figures are equal; (b) *for control and screened lamp groups,* an advantage to the former group in every case except in incidence of whooping cough and progress in school work in which the advantage is to the screened lamp group; (c) *for screened and unscreened lamp groups,* an advantage to the former group in all points except the average "duration per cold" in which the figures are equal, and gain in height in which the advantage is to the unscreened lamp group. *The subjective impressions* of the medical officer were indefinite; the balance of opinion was among the parents in favor of the unscreened lamp group and among the teachers of both lamp groups, the screened lamp group taking first place.

In many of the results, whether obtained by observation or measurement, or from subjective impressions, the numerical differences are very small and in no case are they large enough to signify either a harmful or a beneficial influence from either type of irradiation.

Pulmonary Tuberculosis—Non-Apical Infiltrations. K. Fischel. Calif. & West. Med. 31:237-242, Oct. '29.

Pulmonary tuberculosis in the adult develops, therefore, according to Recker and his school, always from the early infiltrate and extends either through dissemination by aspiration or through the formation of new infiltrates, which are caused by superinfections, to other parts of the lungs until the apical regions are involved. Thus we get the well-known clinical and x-ray picture of the chronic fibrocaseous ulcerative tuberculosis, with late and secondary changes in the apices.

The discovery of the early infiltrate is of great importance because it means that pulmonary tuberculosis very often begins in a region where it cannot be diagnosed by our methods of physical examination. Diagnosis in many cases comes too late; that is, when the tuberculous process has already spread to parts of the lungs which are accessible to auscultation and percussion. Our treatment very often sets in after the patient has already overcome the most critical period of his disease. Since success or failure of treatment and of all preventive measures depend, primarily, on our ability to diagnose the onset of pulmonary tuberculosis and to treat and to separate potential sources of infection, it follows that we shall have to use serial and regular x-ray examination as a routine method in the office and dispensary. As to therapy, the one conclusion that can be drawn at the present time is that, in the treatment of early infiltrates which do not undergo spontaneous retrogression or which show a tendency to progression, surgical measures (phrenecotomy or artificial pneumothorax) should be applied at an early date.

Cancer of the Cervix Complicating Pregnancy. J. A. McGlinn. Am. J. Obstet. & Gynec. 18:592-597, Oct. '29.

"Irradiation of pregnant animals or human beings is a procedure extremely dangerous to the health of the offspring concerned (61.3 per cent defective), and in the case of human beings ought not be undertaken unless such existing pregnancies are to be terminated artificially prior to the period of viability of the child.

"As yet, it cannot definitely be stated that preconception maternal pelvic radium application or x-ray irradiation is or is not prejudicial to the health of subsequent child."

In drawing conclusions from the literature care should be taken to separate the cases radiated prior to pregnancy and those radiated during pregnancy. While there may be some doubt as to the effect of preconception radiation on subsequent children, there can be little doubt as to the serious defects which may develop in the fetus as the result of radiation following conception. While our knowledge is not sufficient at present to draw definite conclusions, it is enough to cause us to elect to do either a complete hysterectomy or a cautery amputation of the cervix rather than to use radium when pregnancy complicates the cancer.

The effects on the child both in pre- and postconception radiation is about the most important question to be solved at the present time. It is urged that every one should carefully record his experiences so that conclusions based on a study of a large series of cases can be drawn.

Roentgenologic Diagnosis of Gastric Ulcer. A. B. Moore. Radiol. Rev. 51:425-428, Oct. 1929.

From a broad viewpoint gastric ulcer is far less frank and characteristic in its roentgenologic manifestations than other diseases of the stomach such as cancer, syphilis or benign tumor. It is also to be borne in mind that gastric ulcer has a relatively low incidence, and the belief that most peptic ulcers were pyloric or prepyloric had currency only at a time when duodenal ulcer was not well understood and the pyloric vein had not been established by the surgeons as a separating land mark. At the Mayo Clinic during 1927 more than ten times as many duodenal ulcers and more than twice as many cancers as gastric ulcers were diagnosed at roentgenologic examination. Statistically, therefore, gas-

tric ulcers have a low incidence and they are less likely to be mistakenly diagnosed than to be overlooked. Finally, let it be said again that only a niche on the gastric border or a fleck within the gastric shadow fully justifies the diagnosis of ulcer. To find it may require close study, but it can be found in nine cases out of ten if spastic manifestations in general and prepyloric narrowing in particular are heeded as signals for careful and repeated search.

The Punch Operation. M. L. Boyd. Urol. & Cutan. Rev. 33:366-369, June '29.

The Caulk cautery punch offers the simplest means of removing urinary obstructions which are caused by prostatic bars of congenital and inflammatory origin, and by vesical orifice contractures of congenital and inflammatory origin. Its use is indicated in a few cases of prostatic obstruction caused by carcinoma of the prostate or early benign hypertrophy. It is in my opinion much the best instrument devised for the purpose.

There are certain details of technic in performing the operation, preparing the patients for operation, and caring for them after operation, which must be observed to attain success.

Roentgen Treatment in Vaquez's Disease. G. Milani. J. A. M. A. 93:1205-1208, Oct. 19, '29.

From the cases referred to in the literature and the author's experience in these two cases, he feels justified in concluding that roentgen therapy represents the most efficacious and the most certain means for the cure of Vaquez's disease, and, when it is well applied and regulated, and accurately supervised, gives brilliant and lasting results, arresting the fatal evolution of the disease.

Only time and experience will tell how long the state of well being of these patients will last. Some months ago his first patient stated that the number of red corpuscles was about 5,000,000 and that she was in good health. Three years has passed since the last irradiation.

As to the organs that must be irradiated, it is apparent that irradiations of the spleen have not given favorable results, though repeatedly tried.

Irradiation of the flat bones will sometimes result in a slight improvement which, however, is transient.

In fact, in the writer's first patient, after roentgen therapy of the sternum and of the vertebral column, a slight improvement was noticed, both in the number of red corpuscles and in the general condition; but after a short time the red corpuscles increased again and the condition of the patient became the same as before.

In the writer's second patient, roentgen therapy of the flat bones did not result in any improvement.

When, on the other hand, the irradiations were applied to the long bones, the number of red corpuscles decreased to normal; the spleen returned to its physiologic limits; the high red coloring of the face diminished and the hemorrhages disappeared, as did all the other subjective secondary symptoms.

The happy outcome of this therapy brings a clinical contribution of great value to the pathogenesis of this disease, because it shows clearly that the element responsible in the hematologic and clinical picture of the disease is the marrow of the long bones, on which the unknown etiologic factor acts almost exclusively, and it indicates the method to be followed in the treatment of polycythemia.

Uterine Fibroids. F. Lindenberg. Radiol. Rev. 51:446-450, Oct. '29.

Roentgen ray therapy of fibromyomata yields most excellent results in the interstitial and uncomplicated type of fibroids in which the main symptom is excessive monthly bleeding. That group includes about 25 per cent of all fibroids. The fibroid pathology *per se*, uninfluenced by any associated systemic diseases, determines the indication for x-ray therapy. A rather mild radiation, the castration dose, is sufficient to produce an amenorrhea and a cure of the patient. If the diagnosis is correct, success is 100 per cent with no untoward results whatever. Cases of uncertain pathology should preferably receive surgical therapy. The indication should always be made by a competent gynecologist.

The Use of Radium in the Treatment of Vernal Conjunctivitis. I. W. Riggins. Radiol. Rev. 51:451-454, October '29.

The results of treatment depend upon the correctness of diagnosis. This should be made by an opthalmologist who is familiar with the disease. Treatment may be instituted at any stage of the disease, care being exercised not to overheat. Complete relief from symptoms can be obtained in practically every case.

Diagnosis and Treatment of Chronic Constipation. H. A. Osgood. Am. J. Phys. Therap. 6:84-92, May '29.

A method is described of estimating the phagocytic power of the polymorphs in patients undergoing deep x-ray treatment, and some possible clinical applications of the test in treatment control are put forward.

Some results with the test are discussed in relation to the theories concerning the effects of irradiation upon leukaemic and other patients.

Mimicry of the Symptoms of Peptic Ulcers. J. S. Hanley. Illinois Med. J. 56:91-96, Aug. '29.

The symptoms of peptic ulcer are often simulated by other lesions, and occasionally the mimicry may be very confusing. The cardinal symptoms, hunger pain and hemorrhage, are, however, usually associated with other evidence that may lead to a correct diagnosis. In the atypical cases of peptic ulcer in which both hunger

pain and hemorrhage are absent, and in cases simulating peptic ulcer, the diagnosis may be extremely perplexing and will require the combination of a careful clinical observation, a thorough laboratory study, and a competent roentgenologic examination, in order to determine the facts.

Actinomycosis. N. Epstein and C. Schoenholz. Calif. & West. Med. 30:395-398, June, '29.

Two classical examples of actinomycosis of the jaw are reported. From one case the *Actinomyces bovis* was cultivated and a specific vaccine was prepared. However, the patient was cured by foreign protein therapy, using a killed typhoid, paratyphoid A and B vaccine before the specific vaccine could be employed.

The iodids are helpful in treatment, but are not specific. When not tolerated well by mouth the drug may be given intravenously without disagreeable effects.

Inasmuch as the causative agent of actinomycosis is not found in nature, the theory that the disease is contracted by chewing straws, grasses, etc., is not well founded, and from a clinical standpoint, this hypothesis in many cases does not fit the clinical history.

Adenocarcinoma of the Fundus of the Uterus. J. B. Meigs. New England J. Med. 201: 155-160, July '29.

Metastatic adenocarcinoma in the vagina from adenocarcinoma of the fundus of the uterus is not an uncommon lesion.

Twelve and one-tenth per cent of all cases of adenocarcinoma of the fundus of the uterus seen at the Collis P. Huntington Memorial Hospital had vaginal metastases.

Cancer in the vagina should not be regarded as primary there until the uterus has been investigated.

Metastases probably take place by way of the lymphatics or possibly by venous channels.

Direct implantation is less probable.

Hysterectomy is to be preferred when the vaginal metastasis seems treatable and the uterine tumor operable.

Radium should be used in the uterine canal and in the metastasis if either the original tumor or the local metastasis is considered inoperable or untreatable.

Infiltration of the metastasis with gold or glass seeds and surface application with about 2500 millicurie hours of lead screened radiation, is the treatment preferred in dealing with the local vaginal metastases.

In 10 out of 16 cases of vaginal metastases radium treatment caused a disappearance of the growth; in 6 cases the growth was not favorably influenced by treatment with radium.

Four proved cases out of twenty-four who had had adenocarcinoma of the fundus and metastatic nodules of cancer in the vagina are alive and well; one patient is alive 9 years, one 7 years, one 5 years and one 7 months after treatment. One other patient treated with deep x-ray therapy is alive and well after 5 years, but this case is not absolutely conclusive. The necessity of careful periodic vaginal examination following either hysterectomy or radium is evident from this study.

Gross and Microscopic Changes in the Skin Produced by X-rays and Lipoid Solvents. L. H. Jarstad and C. W. Lane. Archives Dermat. and Syphilol. 19:954-967, June '29.

Active precancerous lesions histologically have been produced in the skin of the white rat by repeated painting with a diluted tar preparation. The same type of lesion is produced by a single exposure of unfiltered x-rays, or by combining the two procedures. In observing the histologic changes produced by these procedures at different intervals throughout the period of experiment, further evidence was gained that coal tar, allied substances such as mazola oil, paraffin oil and neat's foot oil, and x-rays act similarly in inducing a malignant condition. They act as lipoid solvents.

Scleroderma with Sclerodactylia. L. Edeiken. Am. J. Roentgenol. 22:42-44, July '29.

Three cases of scleroderma with sclerodactylia are reported. All showed bone absorption of the tips of some of the distal phalanges and one showed increased calcium content in the ends of the phalanges. The other two showed small calcareous concretions in the finger tips. It is the presence of the latter combined with the absorption of the finger tips that appears to be characteristic of sclerodactylia.

Rugae Gastricae. M. Galob. Am. J. Roentgenol. 22:33-36, July '29.

The study of the gastric rugae is a much neglected field, yet it may assist materially in gastroenterologic diagnosis.

Three methods may be employed to demonstrate the rugae roentenologically: (1) emptying the stomach partially of the contrast meal; (2) retaining the barium in thin suspension, and (3) displacing the barium meal by pressure over the midspine.

Distortion or localized effacement of the gastric rugae usually indicates infiltration or induration of the mucosa.

The number, size, direction and configuration of the rugae should be described in complete roentgenologic reports of gastro-intestinal examinations.

Mode of Action of Viosterol (Irradiated Ergosterol). New England J. Med., 201: 801-856, Oct. 24, 1929.

The results of experiments made by Bauer and Marble would seem to suggest the conclusion that viosterol increases the amount of calcium which is absorbed from the gastro-intestinal tract. If this increased absorption occurs at a time when the body

needs calcium, there results an increased deposition of calcium and an increase in the number of trabeculae. Complete metabolism studies on patients prove conclusively that there is a marked increase in calcium absorption when viosterol is administered. These results make it apparent why the use of viosterol in the treatment of infantile tetany, rickets and osteomalacia has met with such uniformly beneficial results. They are all disorders of calcium metabolism in which the mechanism at fault is absorption from the gastro-intestinal tract.

Value of Radiology in Diagnosis of Perforated Peptic Ulcer. Surg., Gynec. & Obstet., 49:593-736, November, 1929.

Seventy-two cases diagnosed perforated ulcer were examined by Vaughan and Singer radiologically for pneumo-peritoneum at the time of admission to the hospital. In 63 of the 72 patients the diagnosis of a perforated ulcer was definitely established. Of these 63, 54 had free intraperitoneal air as determined fluoroscopically. In the nine remaining patients the evidence of perforated ulcer was not conclusive, as pneumoperitoneum was absent, laparotomy was not performed, and necropsy was precluded by recovery. The clinical picture in the nine unproved cases corresponds to that seen in perforations which become spontaneously sealed following the escape of a limited amount of gastric or duodenal content. The reason for the lesser frequency of pneumoperitoneum in these *formes frustes* cases is probably the same which explains the mildness of the course; viz., a small leak and trifling leakage. During the period in which these perforated ulcer cases were observed, spontaneous pneumoperitoneum due to other causes (exclusive of trauma) was encountered nine times. In all but two of the nine cases the correct diagnosis as the the cause of perforation was rendered clear by the history and clinical observations.

Cautery Surgery in Uterine Carcinoma. Surg., Gynec. & Obstet., 49:593-736, Nov., 1929.

Percy bases his report on 134 cases treated with the cautery since 1903. Twenty-seven patients are alive and well from three to nineteen years. The pathologic condition in these 27 symptom-free cases was reported by the laboratories as follows: squamous cell carcinoma, 16 cases; adenocarcinoma, 6 cases; and carcinoma, 5 cases. Only a small percentage of these patients are classed as early cases, i. e., cases without involvement of one or both broad ligaments over periods of from eight to eighteen months. Some were recurring cases in which operation had been performed previously. Among these were a small number in which either hysterectomy had been done or radioactive treatments had been given, or both preoperatively or postoperatively. In other words, few were better than borderline and the many were in the usually considered inoperable class.

Hodgkin's Disease in Children: A Clinical Study of Thirty-three Cases. C. Corbeille. Radiol. Rev. 51:492-497, Nov., 1929.

All of the thirty-three patients in this series were under fifteen years and the symptoms appeared in more than half in the first five years of life. All but three of the patients were boys. More than a third of them presented histories of infectious disease at the onset of the typical symptoms. In two the symptoms appeared following trauma and in three constitutional symptoms preceded enlargement of the lymph nodes. Cervical involvement predominated in the adenopathy. Variation in the size of the nodes occurred in about a third of the cases and is an outstanding feature in the series. In half of the cases there was mediastinal involvement. Abdominal symptoms were common, the most frequent being splenic enlargement. Of the twenty-one cases in which a tuberculin test was made, one gave a definite positive reaction and only three gave questionable reactions. Twenty-seven patients were treated by irradiation and of these thirteen are known to be dead or moribund, although all of them had shown remarkable immediate response to treatment. The average length of life was twenty-two and a half months. The life of only one was definitely prolonged, which may be accounted for by persistent treatment. He is living and comfortable at the present time, five and one-half years after the onset of symptoms.

A Review of Uterine Fibroids with Special Reference as to the Use of Radium. W. Neill, Jr. Am. J. Roentgenol. 21:332-335, April, 1929.

While no method of treatment is followed by 100% cures, radium treatment has been effective in a vast majority of cases. Those are excluded from this report which definitely demanded operation, hysterectomy being performed. The fact is also emphasized that if the end-result of radium treatment is not satisfactory, operation has been postponed, with an improvement in the meantime of the patient's health.

Radiosensitive Epidermoid Carcinomas. J. Ewing. Am. J. Roentgenol. 21:313-321, April, 1929.

Radiotherapy has called for the recognition of several types of epidermoid carcinomas, which were not previously regarded as of much significance. Radiotherapy receives definite assistance from the systematic grading of epidermoid carcinomas according to the degree of potential malignancy and the degree of radiosensitivity. The two properties generally, but not always, run parallel.

The radiosensitivity of epidermoid carcinomas is referable to many factors, including anaplasia, vascularity, desmoplastic reaction, rate of growth and especially the tissue of origin.

Radiosensitive epidermoid carcinomas which give poor results with surgery may often be controlled by external irradiation, or by irradiation and surgery and should generally be treated in this manner. The exact scope of the different types of cellular carcinomas of the nasopharynx, transitional cell, Schneiderian, and lymphoepithelioma has not yet been satisfactorily determined and awaits further investigation.

The Indications for Radiation Therapy in Benign Uterine Hemorrhages. H. Schmitz. Am. J. Roentgenol. 21:327-331, April, 1929.

The number of patients with uterine hemorrhages was 802, or 37.70 per cent, in 2,117 cases admitted to the Department of Gynecology. The uterine hemorrhages were divided into three groups: (1) Hypermenorrhea, or profuse and prolonged menses, numbered 335 cases, or 41.98 per cent. (2) Polymenorrhea, or too frequent menses, numbered 97 cases, or 11.60 per cent. (3) Metrorrhagia, or uterine hemorrhage occurring without the menstrual period, numbered 370 cases, or 46.36 per cent, which number includes 253 cases or 31.70 per cent, of cancers. The underlying causes and diseases have been discussed and grouped with the respective numbers and percentages. Those groups indicating medical or surgical treatment or containing the cancers have been deducted as the purpose of the study is the indication for radiation therapy in benign uterine hemorrhages. The number of cases thus remaining is 225. The methods of treatment employed in each group have been given in numbers and percentages and the indications for radiation treatment discussed. Medical treatment was curative in 59 cases, or 26.22 per cent. Surgical treatment was curative in 105 cases, or 46.67 per cent. Irradiation was indicated in 61 cases, or 27.11 per cent. Finally, emphasis has been placed on the necessity of a correct diagnosis before treatment is begun. With a doubtful diagnosis immediate diagnostic curettage or excision of suspicious areas of tissue and microscopic examination must be performed to rule out malignancy.

Radiology of the Thorax. S. Brown. Radiol., 14:515-525, Dec., 1929.

The radiological study of gross lesions of the thoracic organs in three dimensions by the use of the antero-posterior and lateral views is by far superior to stereoscopy in one position.

A knowledge of the exact position and relationship of the intrathoracic structures in the anterior posterior and lateral views is of great value in recognizing abnormal changes affecting any of the structures.

A study of the several structures of the thoracic cavity in the antero-posterior and lateral positions in individuals of both sexes, all ages, heights, and weights, shows that the size varies but the relation of the several structures remain constant under normal conditions.

The combination of the antero-posterior and lateral views demonstrates the thoracic structures in their perspective, thus enabling one to study volumes rather than surface alone.

A New Lead Preparation for the Treatment of Cancer. H. J. Ullman. Radiol., 14:494-495, December, 1929.

A new lead compound is described which is less toxic to the blood than preparations previously used and at the same time apparently as effective therapeutically.

Diverticulum of the Esophagus. P. B. Goodman. Radiol., 14:472-478, December, 1929.

Any patient complaining of a sticking sensation in the throat, cough, soreness on swallowing, with even a small amount of regurgitation of food should have a roentgen examination.

The examination should consist of a thin barium meal observed under the fluoroscope at different angles. Early recognition means early cure. The treatment is surgical by elimination of the sac.

Radium Treatment in Skin Cancer and Borderline Malignancies. A. Williams. Radiol., 14:45-54, January, 1930.

The limitations of radium therapy become less as one's experience increases in the treatment of superficial malignancies. Although it is best for one to judge the radium dose required to accomplish a cure in one treatment, it is not imperative to do so, as stated by some workers. Neoplastic residue has many times responded to the second and third doses.

The authors' cures of lesions in proximity to cartilage have given them reason to hope in radium alone for many of these cases.

With superficial lesions they have had their most reliable results with moderate filtration. They have learned to plan on greater spacing of time between treatments, and no antiseptic dressings in the average epithelioma.

The recurrences are fewer in the radium treated group than in a previous x-ray group. Although the required average radium dose figures less in the latter of the outhors' series, they are convinced that the best explanation for marginal recurrence is insufficient dosage.

Results as traced by follow-up correspondence and observation were 93 per cent successful.

Ultraviolet Therapy in Erysipelas. W. H. Ude. Radiol., 14: 504-507, Dec., 1929.

The treatment of erysipelas by ultraviolet light is advocated as a universally appliable method: (a) it is readily available in practically all communities; (b) it requires only one treatment; (c) it is devoid of danger; (d) it is inexpensive; (e) the results are comparable to those of any other method. The technic of treatment

is simple. It can be carried out with any ultraviolet lamp, and necessitates only a knowledge of the efficiency of the lamp. This form of treatment is applicable to ambulatory patients who can be kept under observation in the home. The data on 91 patients treated by this method are presented.

Etiology, Pathology, Prognosis and Treatment of Carbuncles With Case Reports. C. H. Harris & G. R. Endoe. Texas St. J. Med., 25:537-542, Dec., 1929.

For a better understanding and to direct a more intelligent treatment, an early diagnosis and a proper grouping of cases of carbuncles are necessary.

For carbuncles in group 1 cases, palliative treatment is far more pleasant to patient and just as satisfactory to the physician.

For cases in groups 2 and 3, the earlier the diagnosis is made and a definite detailed plan of treatment is carried out, the more favorable the prognosis and the earlier a favorable termination may be expected.

All predisposing causes should be carefully sought for, and given immediate attention. A very guarded prognosis should be given in the septic cases.

The Value of the X-Ray Examination in Pulmonary Tuberculosis. L. G. Rigler. Minn. Med., 13:25-27, January, 1930.

Technical factors in the roentgen examination of the lung for tuberculosis are of great importance. Fluoroscopy is of little value in the diagnosis of early cases and stereoscopic films of the highest quality are imperative.

A negative x-ray examination is the best evidence against pulmonary tuberculosis that we have. In the presence of symptoms due to tuberculosis in the lungs the x-ray examination is almost always positive.

Every patient with symptoms suggestive of pulmonary tuberculosis should have an adequate x-ray examination regardless of a negative physical examination.

Next to a positive sputum, characteristic x-ray findings are the most positive evidence of pulmonary tuberculosis.

The x-ray findings frequently do not indicate whether the tuberculous lesion is active. This may be better determined by the clinical findings.

The roentgen examination gives an accurate picture of the extent and type of the tuberculous lesion which is present. It is an invaluable aid in determining the type of therapy to be used, the effects of therapy and to follow the progress of the disease.

The Large Bowel in Chronic Arthritis. A. A. Fletcher & D. Graham. Am. J. Med. Sc., 179:91-93, Jan., 1930.

It is believed that the abnormalities observed in the colon in arthritis are manifestations of malnutrition. Malnutrition frequently plays a part in the development and course of chronic arthritis. The abnormalities found in the colon are markedly improved by dietetic treatment with coincident improvement in the arthritis.

Photo-Electrometer With One Stage of Amplification. C. Sheard & A. H. Sanford. J.A.M.A., 93:1951-1957, Dec. 21, 1929.

The following data has been presented in this paper:

A description of a modification of the authors' original photo-electrometer used as a photo-electric hemoglobinometer, in which they have employed one stage of amplification and used a microammeter for the measurement of the current in the photo-electric cell produced by the illumination from a constant source of light which passes through a selective absorptive filter and a specified dilution of blood.

The portability of the instrument and the accurate and rapid determination of hemoglobin expressed in grams for each hundred cubic centimeters of blood, which recommend the photo-electric hemoglobinometer as an instrument of value in the routine examination of a large number of samples of blood in research work.

Complete details regarding the modus operandi of the photo-electrometer.

The theoretical considerations involved in photo-electric photometry as applied to the determination of hemoglobin, indicating that the readings on the instrument follows the laws of Lambert and Beer, in that the concentration of hemoglobin, as determined by the transmission of light in an absorption zone of oxyhemoglobin (beta band), is proportional to the negative logarithm of the unabsorbed light.

Experimental data obtained by the van Slyke, spectrophotometer and photo-electric hemoglobinometer and their comparison together with a determination of the absorption ratios spectrophotometrically (at 540 millimicrons) ad by use of the photo-electric hemoglobinometer, a selective filter transmitting light only in the region of the beta absorption band of oxyhemoglobin being used.

Data substantiating the belief that the photo-electric hemoglobinometer, with one stage of amplification, will permit of the determination of grams of hemoglobin for each hundred cubic centimeters of blood with an average of 2 per cent of the van Slyke values, which have been taken as standards.

The applicability of the principles of photo-electrometry to the determination of amounts of various unknowns in true or colloidal solutions, provided the unknown substance in solution possesses at least one characteristic absorption band for which a spectral filter, transmitting radiant energy only in the specified region, can be made.

The Diagnosis of Tuberculosis of the Tracheobronchial Glands. P. Armand-Delille and C. Lestocquoy. Am. J. Dis. Child., 38:1125-1136, Dec. 1929.

The caseated tracheobronchial glands in infancy and childhood are difficult to diagnose. The physical signs, such as dulness and D'Espine signs, are not constant; the Pirquet test is also not sufficient. The only way to arrive at a proper diagnosis is to supervise all children who have been in frequent and close contact with a germ carrier, and to have good roentgenograms (frontal and lateral) carefully examined, comparing them with films from other cases in which roentgenographic observations have been checked at autopsy.

Some Experiments on Radiant Energy as a Lethal Agent. W. F. Harvey. Indian J. M. Research, 17:507-516, Oct. 1929.

Comparatively low temperatures of the order of 50° C. may be used for sterilization of water and this suggests the possibility of the use of direct sunshine for this purpose in tropical countries. Sterilization is not so easy with albuminous fluids like milk which may have a high initial bacterial content and which provide a medium of growth. The effectiveness of sun heat is greatly intensified in still air. Temperatures obtainable under such conditions may greatly exceed 50° C. and may reach to as much as 70° C. or higher, which temperatures may be regarded as slow cooking as well as sterilizing temperatures. A reduction of temperature is attainable in a still atmosphere by the use of sprinkled water which need not necessarily be cold water. The method can be used for the cooling of railway carriages, etc., which have to stand in the sun before use. Temperatures which are sterilizing in the sun may be incubating temperatures in the shade, so that promotion of growth of micro-organisms goes on in tropical countries simultaneously with sterilization. Ventilation may not always be effective in reducing temperature but much depends in this case on thickness and insulating character of the materials intervening between the sun and the interior of a dwelling and upon the temperature of the outside air. The well-known difficulty of tolerating humid heat and the greater liability to heat stroke under such conditions are borne out by the greater lethality of high temperature with a saturated atmosphere to test animals. Histologically the generally congested state and oedema of the brain and other organs and the lytic action exerted upon the nerve cells of the spinal cord were greater in the moist atmosphere than in the dry atmosphere tests. One might have looked for effects of desiccation in the dry heat test animals and of retention of fluid in the tissues of moist heat animals and these differences were distinctly suggested histologically. The time taken to death would appear to be a factor in the production of significant histological differences. A surrounding of glass which allowed transmission of sun's rays was more lethal to the enclosed animal than a surrounding of an opaque substance like tin and uncolored glass was more effective in this respect than colored. A black coloration to tin results in the production of a much greater inside temperature than when painted white. The use of white clothing in the tropics is an illustration of the application of the principle of reflection and refraction of radiant energy to prevent its deleterious effect upon the human body. Burning by the sun's rays is comparatively easily brought about especially in a still atmosphere. The continued movement of air over the skin is a great protective against burning and against the effects of the sun's rays generally. Proper fore and aft ventilation to the headgear, with cross-bands to prevent the direct contact of the top of the helmet with the scalp would seem to be indicated. As a general summary of this work we may point to the well-known use of water by ingestion and by sprinkling, moving dry air upon the unclothed body and to promotion of rapid evaporation as the most effective means of reducing temperature under conditions of heat stroke; the reverse conditions may enable comparatively low temperatures to be used as a sterilizing agency.

Cardiospasm in the New Born Infant. T. L. Birnberg. Am. J. Dis. Child., 38:1183-1195, Dec. 1929.

Cardiospasm in the new-born infant has hitherto escaped early diagnosis.

Three cases of cardiospasm occurring in the new-born infant are reported. They present similar symptoms, of which the outstanding is forcible vomiting, beginning with the first feeding, occurring during or soon after nursing and showing no gastric contents in the vomitus. Roentgen examination is simple and definitely positive.

The spasm of the cardia is apparently easily overcome by the passage of a catheter through it for a number of feedings. The apparent association with a mild degree of pylorospasm is present in some cases.

The condition of cardiospasm in the new-born infant probably exists more commonly than has previously been apparent and should be considered as a possibility in vomiting of early infancy.

Interpretation of Roentgenograms of the Chest in Children Based on Observations at Necropsy. J. A. Bigler. Am. J. Dis. Child. 38:1166-1182, Dec. 1929.

Evidence of tuberculosis is not found pathologically as frequently as one would expect from the diagnosis of films of the chest. The incidence of tuberculosis in children admitted to the Children's Memorial Hospital is much lower than the figures quoted for tuberculosis in children.

The primary focus is found more often pathologically than on the x-ray film unless calcification is present. The more or less characteristic hilar, or

mediastinal shadow, is the most frequent guide to the diagnosis.

Miliary tuberculosis can be recognized on the films in only about 50 per cent of the cases. It can be differentiated from chronic tuberculous bronchopneumonia on the smaller size of the shadows.

Repeated tuberculin tests when negative are important in ruling out a diagnosis of tuberculosis.

Teeth and Trigeminal Neuralgia. Max Melchior. Internat. J. Orthodontia, 15-1214-1228, Dec. 1929.

Dental neuralgias, the so-called neuralgiform facial pains, pseudo or false neuralgias, can appear with exactly the same characteristics as the genuine or true neuralgias. The two types of neuralgias are often confused, to the great injury of the patient.

In the majority of cases, the so-called genuine (true, idiopathic) neuralgias show upon closer examination a peripheral cause which is most often found in the dental system.

Dental neuralgias can originate from teeth which have been removed long before. The extraction can give causes in various ways to the development of pathologic changes within the jaws which can give rise to neuralgias many years later.

Dental neuralgias need not appear in the trigeminal region, but can show up in other nerves in exceptional cases.

The diagnosis of dental neuralgias can often be especially difficult and necessitates the most careful examination not only of the teeth, but also the jaws. One must in doubtful cases always take x-rays, especially of edentulous areas of the alveolar process.

The prognosis is good if the dental cause is found, as its removal can lead to complete health, even though it has existed for many years.

Pathologic Fracture of Mandible (Osteomyelitis) Following Removal of Impacted Third Molar. H. J. Field. Internat. J. Orthodontia, 15:1212-1213, Dec. 1929.

The author reports case of fracture during removal of an impacted third molar. Patient had had several normal extractions followed by exuberant granulations and throwing off of bone spicules before healing took place. No diabetes or other systemic disturbances was found.

Patient developed periostitis along right side of mandible. Inflammatory granulations with subacute suppuration was noted. X-ray examination revealed a small border of bone holding the ramus and the body intact, with several small sequestra in the bed of granulations. These were gently lifted away, care being taken that the infection did not spread into healthy canaliculi. After irrigation with Dakin solution, wound was dressed with iodoform. Periostitis subsided but pain in both temporomandibular joints developed. Pain became more pronounced. Another examination revealed further sequestration, making division between ramus and body complete.

A retaining appliance for immobilization was applied. A Barton bandage was worn to support the mandible. Iodoform was applied three times a week. Ten weeks after immobolization, condition was entirely healed with early bone regeneration. Slight numbness of the lip was experienced but this is gradually disappearing.

A Consideration of Fractured Roots of Teeth, Based upon a Study of the Causes of Their Fracture and the Methods for Their Removal. M. H. Feldman. Internat. J. Orthodontia, 15:1201-1211, Dec. 1929.

Four classes of root fractures and operative technic for their removal are given. Not knowing when an osteomyelitic condition is present or on the way, when an acute pathologic disturbance involves the area of root fracture, the safest procedure is to establish drainage and operate in the subacute stage. So much can be accomplished under general anesthesia that the author sees in its neglect by the profession only a sad confession of inability to develop a technic which is suitable for general anesthesia. Emphasis is made to the simplicity of the drill technic.

The author emphasizes the use of x-rays in the removal of fractured roots as they give the operator advance information as to length of root, relationship to adjacent teeth and to important anatomic structures such as the maxillary sinus, the manibular canal and the mental foramen.

Pathologic Effects of the Ultraviolet Rays on the Eye and Treatment. E. G. Lear. N. Y. St. J. Med., 29:1270-1273, Oct. 25, 1929.

Ultraviolet rays are capable of producing a definite pathologic condition of the eye called "photophthalmia." From clinical and experimental observations it may be seen that there is a definite period of latency between the time of exposure and the onset of symptoms.

A certain definite amount of these rays are capable of producing the pathologic condition in a one or liminal dose or in fractional or subliminal doses the sum total of which should equal one continuous or liminal dose. The onset of the symptoms are first itching, then pain and photophobia.

It is proven definitely, clinically as well as experimentally that the parts of the eye involved are the conjunctiva, cornea, iris and lens. Whether the retina too is affected by these rays is not definitely established, and remains to be determined by future observation and experiment.

As regards the treatment, the ordinary treatment of conjunctivitis, such as silver nitrate or zinc sulphate, will aggravate the condition. The most gratifying effects are obtained from the immediate installation of a suitable cycloplegic, preferably homatropine, with cold applications and the wearing of smoked glasses against strong rays of light.

Bronchial Obstruction. P. N. Coryllos and G. L. Birnbaum. Am. J. Roentgenol., 22:401-430, Nov., 1930.

The importance of roentgenography in experimental investigations on atelectasis and pneumonia is shown.

Atelectasis, postoperative pneumonitis, lobar pneumonia (in their lobular, lobar or massive varieties) are shown to be produced by the same mechanism. The possible objections to this theory have been discussed.

The identity in pathogenesis of these morbid conditions of the lung is proved by the gross and microscopic appearances, their bacteriology, their circulatory disturbances, their evolution and the modifications in the pulmonary gaseous exchanges occurring in them.

Between them there are, in degree only, differences in local and general symptoms, roentgenographic signs and bronchoscopic findings. Lobar pneumonia is a local pulmonary infection with general manifestations. The management of the local infection is the most important part of the treatment.

They are all due to a factor of great importance—*bronchial obstruction.* Any interference with the free drainage of the bronchial tree will cause lesions the nature, extent, importance and evolution of which will depend upon the degree and duration of the obstruction and nature and virulence of the microbes present.

The rational treatment of these conditions should be based upon their etiology and, as in every other obstructive lesion in the organism, should aim to relieve the obstruction and reestablish free drainage of the bronchial tree.

Lobar pneumonia is a pneumococcic bronchial obstruction, with a combined atelectasis and pneumococcic cellulitis of the corresponding pulmonary area. Treatment should be directed not only against the bacteriemia but chiefly against the local or pulmonary lesion.

Carbon dioxide inhalation in 5 to 10 per cent concentration seems to possess a specific action against pneumococcic pulmonary infections and according to experimental and clinical data, could be used both as a preventive and curative agent.

The Effect of the X-Ray on the Nodules of Verruga Peruana. H. R. Muller and J. R. Tyler. J. Exp. Med., 51:23-26, Jan., 1930.

The supposition that x-ray would affect the developing and the developed verruga nodules experimentally induced in the monkey, has proved correct. The experiments show that the early verruga nodules when exposed to a single, graduated dose of x-ray producing merely erythema of the skin, are inhibited in their evolution. Moreover, the skin of *Macacus rhesus* monkeys is modified by a single erythema dose of x-ray in such a way that infection of it with *Bartonella bacilliformis* is rendered more difficult.

These results are sufficiently striking to warrant the trial of x-ray in suitably guarded doses in the treatment of verruga nodules in man. Should the employment of convalescent serum influence the course on Carrion's disease favorably and the use of x-ray bring about a more certain and rapid devolution of verruga nodules in man, two practically applicable therapeutic measures will have been provided for the treatment of the two forms of the human disease.

Congenital Esophageal Atresia. E. C. Vogt. Am. J. Roentgenol., 22:463-466, Nov., 1929.

Congenital esophageal atresia has up to the present been 100 per cent fatal.

Roentgen-ray examination is most valuable in diagnosis and differentiation.

If surgery is to be of any real value it is important to recognize the type of atresia.

Roentgen Ray Diagnosis in Tuberculosis. C. J. Johanneson. Radiol. Rev., 51:523-524, Dec., 1929.

The authors wish to emphasize that in their opinion no method has ever been found which will give nearly so accurate a picture of lung pathology during life as the roentgen ray film. But the densities upon the film suggesting these pathologic lesions must be studied by the intelligent and trained mind of one who brings his knowledge of the case and the disease to bear, and who frankly interprets his physical findings in the light of abnormal roentgen ray shadows. Thus can a diagnosis be deduced which has real value and a step in advance will have been made.

Radium in the Treatment of Menorrhagia of Adolescence and of the Menopause. L. J. Stacy and R. D. Mussey. Radiol. Rev., 51: 530-534, Dec., 1929.

In the adolescent period, radium should not be used until after all general and other accepted measures of treatment have failed. The dose should be small enough to preclude any possible injury to the ovary. It is better to err on the safe side and repeat the dose several months later if necessary than to use a dose which might permanently injure the ovarian tissue. Although it is hard to establish a definite dosage, we believe that not more than 200 to 250 mg. hours should be used in the initial treatment.

It is evident that the use of radium is of distinct value in controlling menorrhagia of the menopause.

From 800 to 1000 mg. hours of intrauterine radium in a single dose gives satisfactory results in more than 90 per cent of patients treated.

The history of pelvic infection even eight or ten years previously or evidence of pelvic infection is a definite contra-indication to the use of radium.

Preliminary curettage for diagnostic purposes should be carried out in practically all cases in which the patient is more than forty years of age.

The Evaluation of the X-ray Pastille Dose in Roentgen (r) Units. G. W. C. Kaye and W. Binks. Brit. J. Radiol., 2:552-578, Dec., 1929.

A callibration in roentgen (r) units has been made of the B dose indicated by barium platinocyanide pastilles backed with lead and irradiated by unfiltered x-rays from a Coolidge tube excited by voltages between 50 and 100 K. V. from an induction coil. About eight years ago a provisional ionization standard based on an electroscope was set up at the National Physical Laboratory for the purpose of calibrating pastilles. It was then found that the product I. t. of the ionization (I) per unit time produced in the electroscope and the time (t) required for a pastille B dose exciting voltage (70 K. V.) on the x-ray tube. This work has now been extended over a range of from 50 to 100 K. V. and I. t. for the electroscope in question is found to increase with increasing kilovoltage.

A standard ionization chamber (with graphite walls and using air at atmospheric pressure) has been designed and constructed, and by its aid the I. t. readings of the electroscope in question have been expressed in r units for different exciting kilovoltage on the x-ray tube, the results showing that the readings of the electroscope are selective as regards wave-length.

The essential dimensions of the standard ionization chamber have been examined experimentally, and found from a practical point of view to be not so large as those contemplated as necessary by the earlier workers.

The most troublesome factor entering into the measurement of the r unit is the volume of air irradiated. The present results show that this is best represented by the frustrum of a cone of length equal to that of the collecting electrode of the standard chamber, the cross-sectional dimensions being obtained from the images of the x-ray beam on photographic films placed in turn at each end of the collecting electrode. The effective focal distance of the frustrum is measured to the center of the collecting electrode. The correction for lack of uniformity across the section of the x-ray beam introduces some ambiguity into the experimental realization of the r unit. The alternative "cylinder" method of evaluating the effective volume which has been used by some workers, leads in the present work to discrepant and substantially higher results (some 90 ı units larger) for the value of the pastille dose.

As the exciting voltage on the x-ray tube is increased, the value of the pastille dose falls from about 380 r at 50 K. V. to 330 r at 100 K. V. The results are compared with those of other investigators.

Experimental and Theoretical Studies in X-ray Intensity Measurement. W. V. Mayneord. Brit. J. Radiol., 2:267-296, June, '29.

The paper describes experiments on the distribution of x-rays in a water phantom under a variety of conditions. The quality of the radiations has been measured by determinations of the effective wave-length as measured by aluminum and copper absorption while the maximum voltage on the tube has been measured spectographically, using a simple spectrophotometer constructed for the purpose.

Measurements have been made of the intensity of x-radiation at various depths and positions, using a small ionization chamber connected to a gold leaf electroscope. The relation between effective wave-length and percentage depth dose is made to find the relationship between the percentage dose and the size of the field. It is shown that the results are in agreement with a relationship of the form given.

Complete distribution experiments have been made under various conditions and the general type of distribution found by Holfelder is confirmed for filtered radiation, the isodose curves resemble those given by Dessauer for penetrating rays. The implications of this result are discussed. Distribution experiments have also been made for a beam of x-rays impinging on the surface at an angle of 38 degrees to the normal, and it is shown that the rays tend to be scattered forward and hence increase the overlapping in any crossfire method using such oblique radiation.

Variation in the Growth of Irradiated Bean Roots. S. B. Wigoder and R. E. P. Patton. Brit. J. Radiol., 2:588-596, Dec., 1929.

The growth of bean roots is permanently inhibited by large doses of x-rays, and temporarily inhibited by medium doses. No stimulating effect was observed after small doses. With large doses an alteration in wave-length had no effect; with small doses softer rays were slightly more effective. Altering the method of applying the same dose had no effect. Irradiation of different portions of the growing seed had different results. A sudden cessation of mitosis occurred after a large dose, and more gradual cessation after smaller doses. The length of time before mitosis recommenced varied with the dose given. Many abnormal cells were seen.

Efficiency Conditions in Diathermy Circuits. L. H. Clark. Brit. J. Radiol., 2:315-321, June, '29.

When an electrotype is placed in the resonant circuit of a diathermy machine, the apparent energy (amperes x volts x time) required to produce a given rise of temperature is modified by: (1) a change in the frequency of the diathermy current. The apparent energy producing the given temperature is diminished as the frequency is reduced. (2) The insertion of condensers in parallel or in series with the electrolyte, especially for values of the capacity near that which produces resonance. The apparent energy is a maximum under resonance conditions.

Experiments to Determine the Relative Efficiency of Pads Moistened with Saline Solution and Lead Plates as Electrodes with Dia-

thermy Currents for the Production of Heat in a Patient. G. Simon. Brit. J. Radiol., 2:242-243, May, 1929.

Pads soaked in 16 per cent saline tended to become less heated than the media on which they were placed as electrodes, the ratio of surface to depth heat being about the same as with lead applied directly on the media.

On a living subject the maximum temperature recorded by a thermometer on the skin was slightly greater with lead sheets as electrodes than when pads soaked in 16 per cent saline were used. The maximum temperature obtainable just beneath the skin was likewise greater with lead electrodes than with saline soaked pads; the difference, however, was only 0.7° C. On this subject the maximum temperature obtainable just beneath the skin was 41.4° C. (106.5° F.).

These experiments indicate that the maximum temperature obtainable just beneath the skin will be slightly higher when lead sheets placed directly on the skin are used as electrodes, than when saline soaked are placed between the lead and the skin.

Investigation of an Ionization Chamber for X-ray Measurements. L. R. G. Treloar. Brit. J. Radiol., 2:188-195, April, 1929.

An air chamber is described in which the radiation passes perpendicularly through electrodes of graphited paper. The ionization produced in this chamber by homogeneous radiation of wave-length 71 A. U. and 1.54 A. U. is compared with that produced in an ordinary plate electrode chamber.

It was found that each electrode surface contributed an additional ionization equal to that which would be produced by the radiation in passing through .35 mm. of air. This quantity showed no variation with wave-length or distance of separation of the electrodes over the ranges employed.

The advantages and disadvantages of this type of chamber for relative and absolute measurements of x-ray intensity are discussed. Experiments were made on the effect of metal electrodes, and it is shown that the ionization due to the electrode in general increases with atomic number, as would be expected from theoretical considerations.

The Less Common Diverticula of the Upper Alimentary Tract. R. S. Paterson. Brit. J. Radiol., 2:331-340, July, 1929.

Diverticulosis may occur in all parts of the alimentary tract. Its diagnosis is a radiological one. Traction diverticula do occur, but if they give rise to symptoms, these symptoms are probably due to the inflammatory condition which preceded the formation of the diverticulum and not to the diverticulum itself. There is very little evidence to show that the mechanism of pulsion diverticula exists at all. The majority of true diverticula are congenital in origin and in themselves do not give rise to any symptoms.

Investigation on the Products Obtained by Exposing Oils and Carbohydrates to Sunlight in Presence of Air. Sachindra Nath Chakrabarti and N. R. Dhar. Indian J. M. Research, 17:430-438, Oct. 1929.

It has been shown that if olive, mustard, cocoanut, Mahua, castor oil, and linseed oils, butter and some carbohydrates are exposed to sunlight, and air is passed through them, peroxides are formed. These peroxides have been estimated by the amount of iodine liberated by them from an acid solution of potassium iodide.

If the oils are only exposed to sunlight and air is not passed through them, the amount of peroxides is decreased to a great extent. The amount of peroxide formed is due to the layer of air which comes in contact with the oil surface.

All these oil-peroxides have the property of oxidizing a solution of glucose when mixed with them and kept at 40° C. for eighteen hours. The amount of this oxidation is dependent upon the availability of oxygen from the peroxide.

From the experiments on metabolism, using exposed and unexposed oils, iron and sunlight, we have proved that sunlight is the best preventive for diseases like polyneuritis and beri-beri. Olive oil exposed to sunlight and air comes a close second. Whereas iron and unexposed oils are harmful to these pigeons.

The natural food with plenty of sunlight seems to be the best kind of diet for the maintenance of health.

An X-ray Study of Osteomalacia. V. E. Pilley. Indian J. M. Research, 17:348-350, Oct. 1929.

It is usually stated that osteomalacia occurs in women after repeated pregnancies, but observations made of 200 cases where this disease is prevalent does not bear this out. The disease was found in several members of the same family, the children showing definite signs of rickets.

The disease appears to cover an age period from 11 to 45, the majority of cases dating from about 16 years of age.

All bones appear to be affected; the changes are usually most marked in the pelvis and sacrum.

Osteomalacia and rickets are associated, children of osteommalacic mothers frequently having rickets. In early cases the first changes are to be noted in the region of the epiphysis. In later cases the differentiation between cortex and medulla is less clear than normally, the cortex of the bone becoming thin. Fractures are common. Deformities are most marked and important in the pelvic girdle.

When the disease is checked, the outline of bone becomes more clearly defined. There is a tendency to cyst formation, particularly in the region of the great trochanter. New bone is usually denser than normal, particularly in the region of fractures.

Tuberculosis is rarely found in osteomalacia bone.

Osteomalacia (Late Rickets) Studies. Dagmar Curjel Wilson. Indian J. M. Research, 17: 339-347, Oct. 1929.

X-ray findings justify the grouping of certain signs and symptoms as diagnostic of various stages of osteomalacia (late rickets) for the purposes of clinical diagnosis. Although x-rays are helpful for confirming diagnosis and controlling treatment, the grouping of clinical symptoms, the result of study of 152 cases of osteomalacia, should enable clinical diagnosis to be made early, while the case is still in a stage amenable to treatment, even where facilities for x-ray diagnosis do not exist.

There is probably no hard and fast line of demarcation between so-called "late" rickets and osteomalacia; the differences noted clinically depend rather upon the age of onset. The majority of cases occur in women and girls, the condition being extremely rare in the male.

The disease may appear to be sudden, but it must be recognized that a considerable period may elapse before increasing discomfort and pain makes the patient conscious of her affliction.

In early rickets, the gait is uneven, the pelvis is flattened and subperiosteal tenderness is often present in the long bones of the leg. In osteomalacia, the gait becomes the typical shuffling waddle, the pelvis is irregularly contracted, the legs show curving of the shaft, and fracture of long bones may be a prominent feature. The extent of deformity depends on the age of onset, the intensity with which the morbid processes have acted and the length of time the disease has been present.

Die Roentgentherapie der Basedowkrankheit und Ihre Gefahren. (Roentgentherapy of Graves' Disease and Its Dangers.) Rahm. Klin. Wchnschr. 24:1131-1133, June, 1929.

It is out of the question to consider roentgentherapy in exophthalmic goiter as not dangerous. A great many deaths have been described, partly due to the hyperthyreotic response following irradiation, partly to lesions of the larynx. Another danger is given by the possibility of Graves' disease being converted into myxoedema by irradiation. Roentgentherapy cannot with certainty avoid the possibility of producing either myxoedema or life menacing hyperthyreoitic reaction. A further source of danger is the fact that roentgentherapy may hamper the timely chance that operation would afford. Preoperative roentgentherapy is not without dangers, unless basic metabolism be controlled.

Klinische Erfahrungen mit Roten Intensivbestrahlungen an Hand des Haemogramms. (Clinical Experiences with Intense Irradiations of Red Rays Checked by Haemograms.) H. Cramer and G. Fechner. Strahlentherapie, 33:186-195, June, 1929.

The authors have attempted to determine the therapeutic value of frigisolar, a new irradiation apparatus for red light. This apparatus furnishes intense red and ultra-red light, the former with about 10 or 15 Ma., the latter as invisible calorific radiation; both of them can be switched on jointly or separately. The wave length covers from about 600 to 8,000 millimicrons. The advantage of this apparatus lies in the possibility of approaching the body quite close with the so-called cold light radiation, and of entering the various cavities of the body without the least burn taking place. In this way the intensity of the rays may be greatly increased and absorbed without any loss by the corresponding parts of the body. Since the penetration action of red rays amounts to about 4 Cm., all inner organs can be reached, thus resulting in a favorable deep hyperemia. The treated cases chiefly covered chronic and subacute polyarthritis, chronic prostatitis, chronic and acute otitis media, chronic appendicitis, abdominal postoperative troubles due to adhesions, chronic and subacute adnexitis, myalgias, neuralgias, burns and frostbite.

Technic: Irradiation at 15-30 cm. distance; time, five-ten-thirty minutes. Results, temporary reduction of pain in the early stages, which becomes permanent after 4 to 15 irradiations. The number of treatments varies with the pathology.

For the purpose of objective check-up of the results, the blood picture may serve as indicator. It mostly shows lymphocytosis associated with more or less marked monocytosis and eosinophilia. Frequently red light irradiation will supplement x-raying; the more harmless red light irradiation being in certain cases used first. If they fail they can then be replaced by x-raying.

Die Behandlung der Ischias. (The Treatment of Sciatica.) A. Gerome. Ztschr. f. Arzt. Fortbild. Ann. 26, 1:9-15, Jan., 1929.

In all cases of chronic sciatica, massage is to be applied both in order to combat eventual muscle atrophy and to activate the nutrition and metabolism of the diseased limb. Massage is to be performed with great caution; care is to be taken not to damage the nerve. The association of massage with Swedish exercises and Zander mechanotherapy seems to be useful. Thermic treatment, however, is the best remedy. In patients with weak constitutions local thermic procedures (mud packs, fungo packs, vapour douches), are advocated; otherwise hot, full baths which tend to promote general hyperemia, diaphoresis and unquestioned analgesic action. The patient's metabolism is thus improved and favorably influences many types of sciatica. Laqueur has pointed out the importance of simultaneous cutaneous stimuli in the bath. In this respect the so-called Heller baths have stood their ground. These baths are given with a temperature of from 36 to 38 degrees C. with a very copious addition (8 liters) of aromatic plant extracts; a galvanic current of about 3 amperages is at the same time passed through the water. Good results have also been obtained with the so-called

transcutaneous baths. They consist in a complete bath, the temperature of which is gradually increased to from 30 to 40 degrees C., a preparation being added which apparently contains plant extracts, turpentine and volatile oils as well as menthol. Gerome points finally to the procedure of Monari at Florence. This author causes a paste to be put on the diseased nerve, which acts somewhat in the manner of the transcutaneous baths. It first produces a sensation of intense cold which is followed by a sharp, burning feeling. Since this paste is put on as a pack, it clings to the skin very tightly and apparently hermetically, thereby producing a thermic effect by preventing the loss of heat. Monari's procedure therefore represents a strong stimulation of the skin associated with thermic action.

Mesothoriumbehandlung der Prostatahypertrophie. (Mesothorium Treatment of Prostatic Hypertrophy.) A. Hutter. Wien. Med. Wchnschr. Ann. 79, 30:975-976, July, 1929.

Hutter advises to irradiate inoperable prostates instead of treating them with retention catheters and suprapubic fistulas. He applies mesothorium enclosed in gold needles 1 cm. long and 0.3 cm. thick; each capillary contains 1 millicurie. The gold filter retains the alpha and beta rays, so that practically only the gamma radiation can act on the tissue. The mesothorium needles are introduced at the perineum through an incision 0.5 cm. long and pricked into the hypertrophied prostate gland; one feels the penetration of the prostate capsule. By rectal palpation the entering of the needle into the tumor can also be ascertained. Report of three pertinent cases with good results.

Zur Roentgenbehandlung der Akuten Entzuendung der Mittelohrraeume. (On Roentgen Ray Treatment of the Acute Inflammation of Middle Ear Spaces.) Goldmann. Strahlentherapie, 33:152-155, June, 1929.

In fresh inflammations, early irradiation shortens or sometimes aborts the course; inflammatory manifestations may clear up without perforation of the tympanic membrane taking place, or it may follow or be associated with the spontaneous rupture of the membrane shortly after irradiation. But if paracentesis has been done, then the irradiation produces a striking reinforcement of the local tissues. In cases, too, in which there are already inflammatory manifestations on the part of the mastoid process, roentgen irradiation in case of previous spontaneous perforation or after performance of paracentesis causes a more energetic secretion than is generally observed. As to technic, the single field especially covers all of the mastoid process. In case of need, the irradiation also includes the zygomatic region, the squamous portion of the temporal bone, the occiput and the petrous bone, together with the important perilabyrinthic and peritubar cells. It is generally not recommended to irradiate the region of the auditory meatus of the ear drum tympanic cavity, because the cartilaginous parts of the outer ear could thus be damaged. According to the strength of inflammation Goldmann chooses as irradiation dose 10 to 20 per cent of the USD which can be increased in case of torpid course and diminished in case of stormy manifestations. Since it is chiefly the deep parts of the pneumatic system which are to be influenced, harder radiation is indicated (150 KV with 0.3—0.5 mm. Zn plus 1 mm. Al filters).

Betrachtungen ueber Wandlungen in der Bewertung der Heliotherpie. (Considerations on the Changes the Valuation of Heliotherapy Has Undergone.) Kurt Klare. Munchn. Med. Wchnschr. Ann. 76, 31:2191, August, 1929.

In contra-distinction to prior views, the principle of precluding any solar irritation in all forms of pulmonary tuberculosis is nowadays prevailing. In surgical tuberculosis, also, the author administers local and general irradiation to a minimum (from two to three hours), as he has convinced himself that short stimulation by solar light exerts a much more favorable influence than does a protracted one. Patients in the stage of morbid anaesthesia (highly increased sedimentation speed) are at first to be kept back from solar effects; they are not to be submitted to irradiation until their defensive power has increased under the climatic stimulus which is determined by the continuous control of the blood sedimentation speed. Permanent heliotherapy is only indicated in tuberculous diseases of the skin. Here the result of most intensive insolation is a good one in all cases, as the focus as such can be influenced directly by the effect of light. It must not, however, be forgotten in the therapeutics of skin tuberculosis, to inquire into the condition of the lungs by clinical and radiological researches. Finally the author points out that his inferences do not modify the postulate of submitting frail or healthy children to light and air treatment, for there the matter is the action on moving bodies, whereas in sick children the sun is made to act on the resting body.

Die Neue Strahlenbehandlung der Magengeschwuere. (The New Irradiation Treatment of Peptic Ulcers.) E. Kolta and B. Dunay. Klin. Wchnschr. Ann. 8, 24:1125-1127, June, 1929.

The authors observed the same degree of recovery taking place in patients with peptic ulcers when an indifferent part of the body was irradiated, for example the thigh instead of the stomach. Healing of gastric ulcer, therefore, does not require that the rays reach the ulcer. The acid blood reaction of the patient is shifted by roentgen rays to the alkaline direction; it is probably this factor which plays a prominent part in the healing of gastric ulcer. This acid-base imbalance in the system can, therefore, as the authors have now shown, also be obtained by the superficial irradiation

of parts of the body distant from the stomach. With this mode of irradiation the patients can almost always follow their occupation and are not obliged to stay in bed. They are only obliged to follow a special diet at the onset of the treatment. Finally it is to be noted that roentgen ray sickness commonly arising in case of irradiation of the stomach is missing or shows itself only to a very slight extent when neither the stomach nor the trunk are irradiated.

Technic: Irradiation of four fields the size of 15 by 15 cm. (anterior and posterior aspects and both sides of the thigh); testicles and ovaries must be accurately protected. Each field was irradiated by 3/4 USD filtered by 3 mm. Al. The irradiation was given on four days successively, the course being repeated, if necessary, after four, eight or twelve weeks. The hydrogen ion concentration of the patients ought to be determined before and after each irradiation course.

Ueber Tonsillartumoren und Deren Behandlung mit Roentgenstrahlen. (On Tonsillar Tumors and Their Management with X-rays.) Matthaus Christiforidis. Ztschr. f. Hals-Nasen-und Ohrenheilkunde, 22:554-562, 1929.

Report on the malignant tumors submitted to irradiation in the Roentgen Institute of the surgical university clinic of Leipzig from 1919 to 1927. Twelve carcinomata and 15 sarcomata of doubtful diagnosis were irradiated.

Technic: 4 ma., 160 KV, 0.5 Zn and 3 Al. Focal distance 23 or 30 cm. Irradiation fields: both sides of the neck, oral cavity and cheeks. Doses: 60-100 per cent USD. The results obtained, especially in carcinoma, were not particularly satisfactory. The average duration of life of the carcinomas amounted to six months or so from the start of the irradiation; that of the sarcomata to about eighteen months and a half. The prognosis, especially for sarcomata, is less unfavorable with irradiation treatment—preferably combined with radium—than with surgical treatment.

Cauterization with Sun Light. Prof. Schoenberger, Berlin Department of Hydrotherapy, University of Berlin, Medizinischen Wchnschr. 40:1675, 1929.

Professor Schonenberger calls to our attention the value of exposing the skin to concentrated sun rays. He discusses briefly the historical uses of this method of treatment in skin diseases which method was first used by Pierre Andre Mathiole (1570) and later by Thomas Fienus (1598). He also mentions the fact that the late Dr. O. V. Thayer, formerly of San Francisco, had used this method of treatment beginning in 1860. Dr. Thayer had used this method for many years in thousands of cases. Dr. Thayer summed up its use as being "without much pain, without a great deal of reaction." The author has used this method since 1907 with very satisfactory results.

Die Roentgentherapie bei Klimakterischen Beschwerden. (Roentgentherapy in Climacteric Disturbances.) J. Borak. Strahlentherapie, Heft.1, 33:142-146, June, 1929.

Roentgentherapy against climacteric disturbances deserves to be given the preference above other remedies in clinical practice. As most of the medicinal and organotherapeutic remedies must often be taken for a very long time, occasionally even uninterruptedly, this fact is a great and material burden for out-patients, whereas x-ray irradiation is comparatively cheap. Roentgen ray irradiation is absolutely to be administered in case of climacteric disturbances when other medications have proved ineffectual. As to the technic of irradiation, Borak proceeds as follows: With each woman an irradiation of the pituitary gland from three fields was first performed. These are the two hairless temporal fields, the size of 4 cm. by 14 cm., and an interocular field; the glabella forming the nadir of the central ray so that the pituitary gland can be reached from every field without any centering apparatus. The three fields were for the most part irradiated every third day, each field being given a third of USD. According to the effect, the irradiation was repeated after from two to four weeks, the interval between the individual exposures undergoing no change or a prolongation up to eight or fourteen days. Cases insufficiently or not improved received two irradiations over the thyroid gland with the same superficial dose at four days' interval. The irradiation was repeated after from two to four weeks, again pari passu with the irradiation effect.

Elektrokoagulation von Blasentumoren. (Electrocoagulation of Bladder Tumors.) G. Kolischer. Ztschr. f. Urolog. Chirurgie, 27: 371-373, July, 1929.

The destruction of bladder tumors by heat, generated by high frequency currents, is applied in a double way. The tumors are cauterized with a wire electrode introduced through the cystoscope, or electrodesiccated by the action of discoid electrodes through large opening of the bladder. The former procedure can only be applied in tumors of benign character. In clinically malignant cases the bladder is opened by means of the electric knife (radio knife), then drained by the electric aspirator. According to the author the use of the radio knife sterilizes and prevents dissemination of tumor tissue. Electrocoagulation is then performed after the introduction of vaginal specula. The surface of the tumor body should be carbonized as a last step in order to prevent hemorrhage and drafting of tumor particles. In case of pedunculated tumors the body of the tumor is drawn forward by forceps and the pedicle separated close to its insertion by the radio knife, and the stump electrodesiccated. In case of broadly implanted neoplasms the first coagulum is to be curetted off and then electrodesiccated. The coagulation electrode should be in constant contact with the

tumor in order to avoid spark formation. The necessary amperage is gradually raised to a practical level. In order to avoid perforation into adjacent organs, an assistant introduces two fingers into the rectum or vagina before coagulation is begun. The sensitivity of the fingers act as a guide to the amount of coagulation. The wound is closed in the usual manner.

Zur Roentgenbestrahlung Postopertiver Liquorfisteln. (On Roentgen Irradiation of Postoperative Cerebrospinal Fluid Fistulas.) L. Schonbauer. Wien. Klin. Wchnschr. Jg. 42, 19:647-648, May, 1929.

The author stresses the possibility of the occurrence of cerebrospinal fluid fistulas from the start or following the puncture of the ventricle under high pressure when the cerebrospinal fluid flows off during operation. Cerebrospinal fluid fistulas often arise after operations practiced in the posterior cerebral fossa. In order to remove these fistulas the inhibitory action of roentgen rays on secretion is utilized. The author describes three cases (tumor in the level of the right parietal bone, cerebellar neoplasm, hydrocephalus) in which cerebrospinal fluid fistulas formed subsequent to the operation and were favorably influenced by roentgen ray irradiation. It was performed by irradiating with from 60 to 70 per cent of the skin unit dose from four large fields (forehead, occiput, both temples). The irradiations were administered for four days successively, a single field being irradiated every day to prevent a stormy early reaction.

Bemerkungen ueber den Tonisator als Heilbehelf in der Chirurgie. (Observations on the Toniciser as Curative Adjunct in Surgery.) K. Siegel. Med. Klin. Jg. 25, 25: 960-961, June, 1929.

The toniciser devised by Ebel has been introduced into electrotherapy for some time past; it has thus far chiefly been used by neurologists. Siegel is now using the apparatus also in surgical cases because of its pain allaying as well as tonicizing massage action. Its effects depends upon utilization of faradic surging (increasing) currents, and the simultaneous, rythmic variation of the amperage of the frequency. This apparatus has stood the test in lumbago, chronic osteomyelitis, radiating pain in malignant tumors, bone pain due to injuries, distorsions, myalgias and in the after treatment of bone fractures. The number of applications varies between two and fifteen; duration of a single application twenty minutes. The toniciser was found most useful in the treatment of lumbago and other myalgias; pain often ceased after the first session. The tension of the lumbar muscles remitted; the same effect was found to follow in the after treatment of bone fractures. Siegel feels that the toniciser would seem to be apt to replace operative interference when applied in some angiospastic conditions together with other physical curative methods.

Die Behandlung der Boesartigen Neubildungen mit Radioaktiven Substanzen. (Treatment of Malignant Neoplasms with Radioactive Substances.) Zentralb. f. Chir., Ann. 56, 18:1131-1138, May, 1929.

The effect of radiotherapy is in certain cases superior to that of other methods. In superficial cancer of the skin from 80 to 90 per cent permanent cures may be obtained, often as soon as after the first exposure. In large carcinomata of the skin the success is less easy to obtain, but the radioactive substance here proves superior to all other methods when measured in speed of efficiency or prospects of permanent results. The influence on roentgen refractory tissue by radium and the possibility of curing cancer of the skin in damaged territories by needling are of great importance. Small cancers of the lips react like cancers of the skin; in larger invading cancers of the lips radium treatment is superior to x-raying as long as there are no metastasis; if there are metastases, the combined radio-surgical therapy is preferable. Good results are obtainable in tonsillary sarcoma; in tonsillary cancers the effect is only transient; the same is also true of pharynx sarcoma. Circumscribed cancers of the breast can be cured by radiotherapy with great security. In lymphosarcoma and lymphogranuloma radium treatment is the method of choice so long as the glands are still well located; with larger, superficial areas, as well as with intrathoracic or intrabdominal location only roentgen treatment can be considered. Radiotherapy is particularly superior to operation in carcinomas of the vulva and vagina, and in melanotic tumors. Improvement is in general only transitory in oesophageal carcinoma, although permanent cures have already been observed. The results are only of palliative nature in carcinoma of the rectum, and of the prostate gland.

Les Rayons Lumineux et Infra-Rouges dans le Traitement des Plaies Atones. (Luminous and Infra-Red Rays in the Management of Indolent Wounds.) E. Biancini and H. Biancini.) Revue d'Actinol., 5:77-78, 1929.

Irradiation by light and infra-red rays is indicated in case of flaccid granulations, such as are found after operations, in which healing by first intention is not obtained, in case of irrationally treated ulcers or of ulcers due to circulatory disturbances (mal perforant), and in case of varicose ulcers of the leg, ordinary burns, roentgen and radium burns, as well as of frost bites. Under irradiation pain is reduced and ulcers show a tendency to heal. The results are nearly always favorable in case of frost bite and burns, good in case of flaccid granulations, uncertain, however, in case of varicose ulcers of the leg and "mal perforant." In case of roentgen and radium burn, too, definite success is to be attained if the burn is not old.

Technic: Irradiation with white light or red and infra-red rays or blue light daily; sometimes every second day; sometimes, however, in order to obtain quick results, twice a day. One must not, however, overlook the danger of causing burns where there exists cutaneous sensibility.

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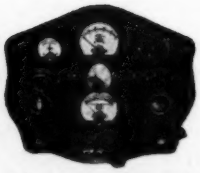

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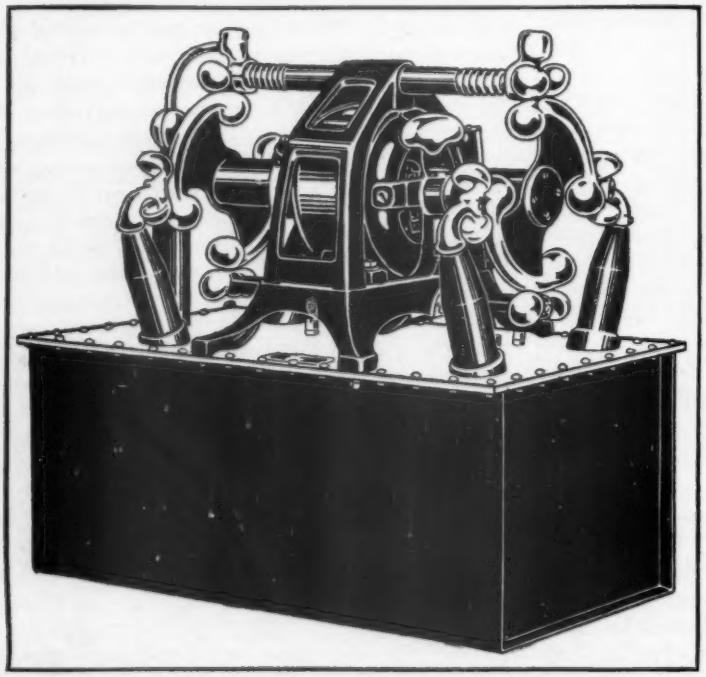

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